



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor

Robert L. Morgan
Executive Director

Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210

PO Box 145801

Salt Lake City, Utah 84114-5801

(801) 538-5340 telephone

(801) 359-3940 fax

(801) 538-7223 TTY

www.nr.utah.gov

June 12, 2003

CERTIFIED RETURN RECEIPT
7099 3400 0016 8896 2185

Chris Gypton
Hecla Mining Company
Box C-8000
6500 Mineral Drive, Suite 200
Coeur D'Alene, Idaho 83815-9408

Re: Withdrawal of Conditional Approval of Alternative Post Mining Land Use, Hecla Mining Company, Escalante Silver Mine, M/021/004, Iron County, Utah

Dear Mr. Gypton:

On March 25, 2003, we sent you a letter withdrawing the Division's Conditional Approval for your alternative post mining land use for the Escalante Silver Mine. That letter stated that if you did not appeal our decision to withdraw the conditional approval, the Division would return your application for the land use change.

On April 7, 2003, we received your reply to that letter, stating that the best course of action at this time is to resubmit the post mining land use proposal once the State Land Tract/BLM land title dispute has been resolved.

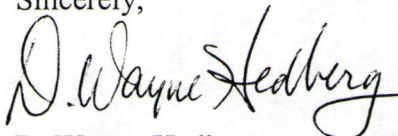
We have enclosed the following submittals received: amendment - February 4, 1997; amendment - February 13, 1998; reclamation surety estimate - January 11, 1999; Real Estate Purchase and Sale Agreement - February 9, 1999; Sales Agreement - September 16, 1999, and Business Plan - Global Energy Technology, LLC - July 20, 2001.

By withdrawing the alternative post mining land use, Hecla's original reclamation responsibilities under their original approved permit apply to this portion of the site. Annual report, permit fees, etc. continue to be the responsibility of Hecla Mining Company.

Page 2
Chris Gypton
June 12, 2003

If you have any concerns regarding the content of this letter, please contact me at (801) 538-5286 or Lynn Kunzler at (801) 538-5310.

Sincerely,

A handwritten signature in black ink that reads "D. Wayne Hedberg". The signature is written in a cursive style with a large, stylized "D" and "H".

D. Wayne Hedberg
Permit Supervisor
Minerals Regulatory Program

jb

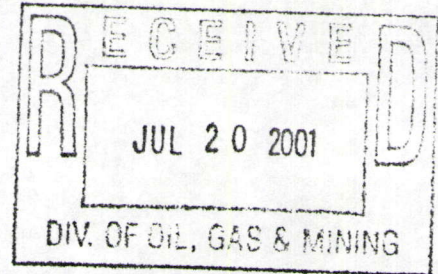
Enclosure: 5 documents (noted above)

Cc: Carl Hartman, Dixie Cable Services
Clifford Dunn, Esq.
Joe Incardini, BLM State Office
Ed Ginouves, BLM, Cedar City
Will Stokes, SITLA

P:\GROUPS\MINERALS\WP\M021-Iron\M0210004-Hecla\Final\anduse-return-06122003.doc

M/02/004

Business Plan



Global Energy Technology, LLC

31 N. 700 E. Suite 223

St. George, Utah 84770

(801) 674-4143

(801) 652-8174 fax

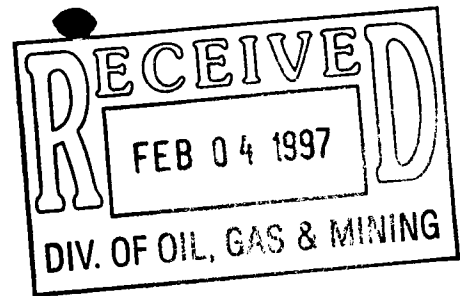
Returned 6/12/03

established 1996

contact person - Dave McFadden, CEO

This business plan contains proprietary information that is not to be shared, copied, disclosed or otherwise compromised without the written consent of Global Energy Technology, LLC.

This is a draft of a business plan and therefore does not imply an offering of securities. There is no protection, written or implied under the securities act of 1933.



January 31, 1997

Mr. D. Wayne Hedberg
Division of Oil, Gas, & Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801

*Returned
6/12/03*

RE: Escalante Amendment to Reclamation Plan M/021/004

Dear Mr. Hedberg:

Enclosed is a copy of the Amendment to Reclamation Plan M/021/004 which addresses a change in the proposed post-mining land use at the Escalante Unit. As discussed in our December 12, 1996 meeting, Hecla is attempting to sell the property to an entity that plans to use the existing facilities in their business. The enclosed Amendment includes a copy of their business plan which describes their intentions for the property in detail. The real estate transaction would be contingent upon approval by UDOGM for the proposed change in post-mining land use.

Hecla would remain responsible for bonding several items at Escalante and they are described in the Amendment.

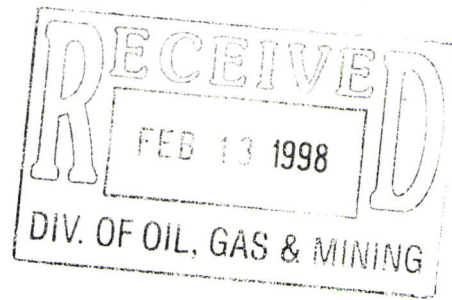
Please give me a call at (208) 769-4157 if you need any additional information.

Sincerely yours,

Alan Wilson
Senior Reclamation Engineer

cc: L. A. Drew





February 11, 1998

Mr. D. Wayne Hedberg
Division of Oil, Gas, and Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801

RE: Amendment to Escalante Reclamation Plan M/021/004

Dear Mr. Hedberg:

On January 31, 1997 I submitted to you an amendment to Reclamation Plan M/021/004 that described a change in post-mining land use. After I made that submittal negotiations stalled and I requested you defer any further action on the amendment.

We are now working on a sales agreement with the same prospective buyers and I would request you proceed with action necessary to gain approval for the post-mining land use as specified in the January 31, 1997 submittal. The information provided earlier is still valid.

Give me a call at (208) 769-4157 if you have any questions.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "Alan Wilson".

Alan Wilson
Senior Reclamation Engineer

cc: L. A. Drew



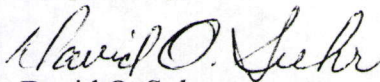
Activities Remaining To Be Completed

Description	Amount DOGM est.	\$/Unit		Estimated Cost-\$
Ripping tailing road(0.40 mph)	1.6 acres	603	to be completed	965
Re-seeding road	1.6 acres	290	to be completed	292
Monitor groundwater	1 year	1,200	to be completed	1,200
Fencing borrow areas	10,000 LF	1.00	to be completed	10,000
Mobilization	2 units	1,000	to be completed	2,000
Fence Maintenance	3 years	400	to be completed	1,200
Re-seed tailing pond (if needed)	65 acres	290	to be completed	1,740
SUBTOTAL				\$ 17,397
+ 10% CONTINGENCY				1,740
SUBTOTAL				\$ 19,137
+ 3YR ESCAL				\$ 574
UPDATED TOTAL				\$ 19,711

Hecla's current surety is based on activities amounting to \$389,300 which includes projects not planed under the new proposed post mining use. It is our position, that based on the remaining activities, the surety should be \$19,711. We therefore request that the surety be reduced according. Thank you for your consideration.

If you have any questions or request more information please contact me at Hecla's corporate office.

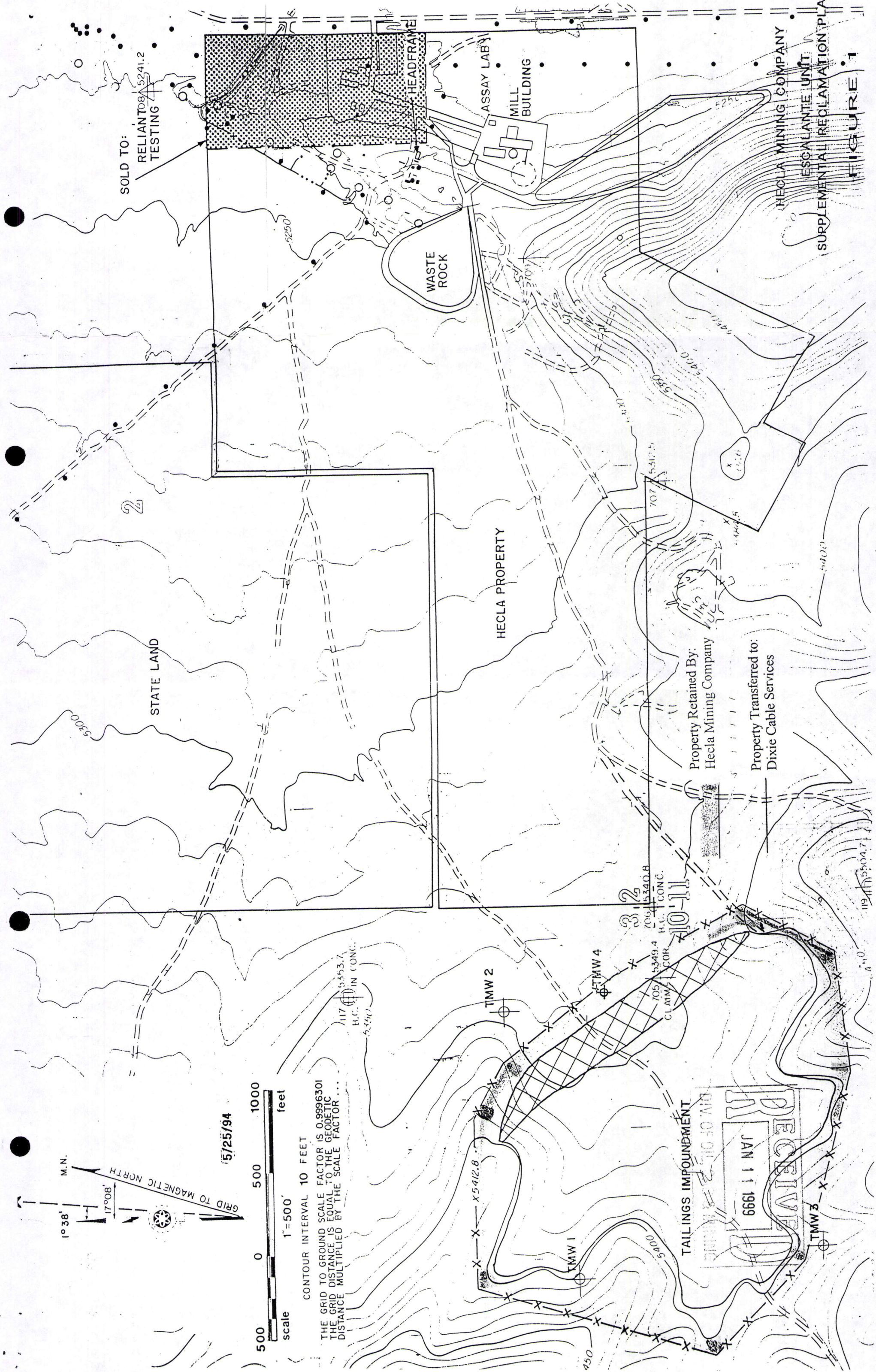
Respectfully,



David O. Suhr
Idle Properties Mgr.

cc: L.A Drew
L. L. Johnson

Map Enclosed



m/c 21/008

SECOND AMENDMENT

TO

REAL ESTATE PURCHASE AND SALE AGREEMENT

This Second Amendment ("Amendment") to the Real Estate Purchase and Sale Agreement between Hecla Mining Company ("Seller") and Dixie Cable Services ("Purchaser") is entered into and effective this 9th day of February, 1999.

WITNESSETH

WHEREAS, the parties entered into a Real Estate Purchase and Sale Agreement ("Agreement") dated September 11, 1998; and

WHEREAS, the parties entered into a First Amendment to that Agreement dated December 28, 1998; and

WHEREAS, the parties desire to amend certain portions of the Agreement,

NOW THEREFORE, in consideration of delaying the closing date and other good and valuable consideration, the parties agree as follows:

1. Paragraph 2.B. shall be amended by changing the Closing Date from "on or before January 29, 1998" to "on or before March 15, 1999"

2. Paragraph 2.D. the second sentence is deleted in its entirety and replaced with the following sentence:

In addition, Purchaser agrees at its sole expense, to complete the mill site clean-up ("Clean-up") in a manner sufficient to meet the requirements specified in this Agreement.

3. Paragraph 8.G. is deleted in its entirety and replaced with the following:

The clean up obligations of Purchaser set forth in Section 2(D) and Exhibit "C" of this Agreement, representations and warranties set forth in Section 3, covenants in Section 7(B) and the agreements in Sections 5(A) and 5(B) shall survive Closing Date and shall not merge into any of the deeds, assignments or other instruments delivered at closing.

4. Exhibit "C", under the section Standards, shall be amended as follows:
- The soil clean up standard for lead shall be changed from "100 ppm for lead" to "500 ppm for lead, provided the state approves this standard in writing."
 - A new sentence shall be added to the end of this section as follows:

"Buyer shall provide to Seller a copy of the written approval by the state of Utah concerning change of the lead clean-up standard."

5. Exhibit "C" shall be amended by adding the following Section:

Treatment, Storage, and Disposal of Materials.

Materials that have been accumulated as a result of clean up activities may be treated, stored and/or disposed of on site provided: (1) such treatment, storage and/or disposal is done in accordance with this Agreement and applicable federal, state and local laws, regulations and ordinances ("Applicable Laws"); and (2) the state of Utah, Department of Environmental Quality ("State") approves of such on-site treatment, storage and/or disposal in writing. Purchaser further agrees that it will provide Seller with a copy of such written approval.

In the event that the State does not approve of the on-site treatment, storage or disposal of materials; or such activity cannot be done in accordance with Applicable Laws; Purchaser agrees to dispose of such materials at an off-site disposal facility in accordance with Applicable Laws.

6. Other Provisions. All other provisions of the initial Agreement and First Amendment shall remain in full force and be binding upon the parties hereto.

IN WITNESS WHEREOF, the parties hereto have signed and accepted the terms and conditions of this Second Amendment to Real Estate Purchase and Sale Agreement.

DIXIE CABLE SERVICES

By: Carl R. Hardmen
Carl R. Hardmen
(print name)

Title: General Manager

HECLA MINING COMPANY

By: Michael B. White
MICHAEL B WHITE
(print name)

Title: Vice President

STATE OF IDAHO)

County of Kootenai)

) ss.

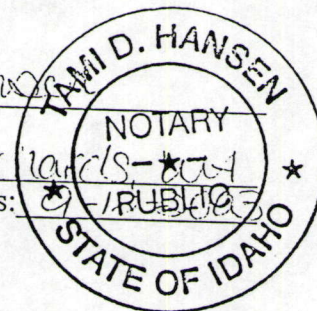
On this 20th day of February, 1999, before me, the undersigned, a Notary Public in and for the State of Idaho, personally appeared Michael B. White, known or identified to me to be the Vice President of Hecla Mining Company, the officer who executed the instrument on behalf of said corporation, and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal the day and year in this certificate first above written.

Tami D. Hansen
Notary Public

Residing at 415 N. 1st St. - Star

My Commission Expires: 9-1-2003



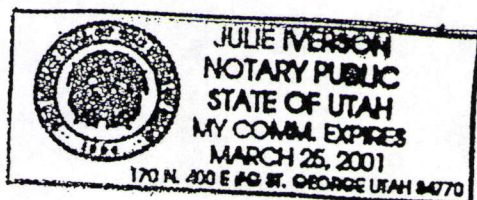
STATE OF UTAH)

County of Washington)

) ss.

On this 24th day of February, 1999, before me, the undersigned, a Notary Public in and for the State of Utah, personally appeared Carl K. Hardman, known or identified to me to be the General Manager of Dixie Cable Services, the authorized individual who executed the instrument on behalf of said company, and acknowledged to me that such company executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal the day and year in this certificate first above written.



Julie Iverson
Notary Public

Residing at _____

My Commission Expires: _____



September 15, 1999

Mr. D. Wayne Hedberg
Division of Oil, Gas, and Mining
1594 West North Temple, Suite 1210
P. O. Box 145801
Salt Lake City, UT 84114-5801

Re: Sales Agreement between Dixie Cable Services and Hecla Mining Company

Dear Mr. Hedberg:

Enclosed is the sales agreement that we discussed between Dixie Cable Services and Hecla Mining Company.

I hope this will resolve some of the questions.

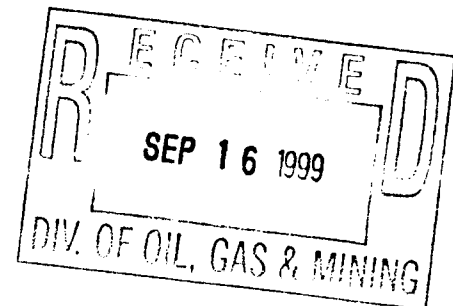
If you have any questions please feel free to contact me at the Hecla Mining Company office.

Respectfully,

A handwritten signature in cursive script that reads "David O. Suhr".

David O. Suhr
Idle Properties Mgr.

Enc.





ROUTE TO:

~~N. Anthony~~ ~~A. Lang~~
~~J. Galbavy~~ ~~N. Rodgers~~
S. Hilbert J. Stilwell
~~D. Suhr~~

RETURN TO:

L. Johnson

AGREEMENT TRANSMITTAL

FROM: LauraLee Johnson *JK*
Lands Administrator

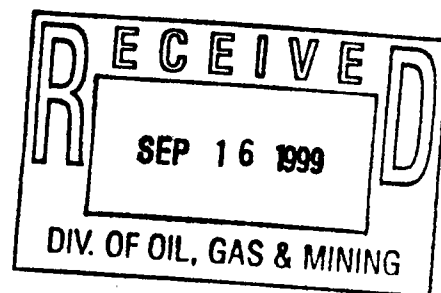
Attached is a new Real Estate Purchase & Sale agreement pertinent to your area of responsibility, date and initial to next person on the routing list. Should you have any qu call me at extension 158.

For Closing of Sale:

*Ami preparing deed?
Bill of Sale?*

4/VM for Ami 12/3 11:48

CONTRACT NAME: Real Estate Purchase & S
and Dixie Cable Services (
CONTRACT FILE
NUMBER: R127-B
PROJECT NAME: Escalante Project, Iron County, Utah
PROJECT MANAGER/
CONTACT: Dave Suhr/John Galbavy



	Date	Initials
Narda Anthony	<u>10/2/98</u>	<u>NLA</u>
John Galbavy	<u>10/2/98</u>	<u>JG</u>
Stan Hilbert	<u>10/9/98</u>	<u>SH</u>
Alan Lang	<u>10/12/98</u>	<u>AL</u>
Nancy Rodgers	<u>10/13/98</u>	<u>NMR</u>
Jack Stilwell	<u>10/14/98</u>	<u>JS</u>
Dave Suhr	<u>12/15/98</u>	<u>DS</u>

REAL ESTATE PURCHASE AND SALE AGREEMENT

This Real Estate Purchase and Sale Agreement (hereinafter referred to as "Agreement") is made and effective this 11th day of September, 1998, by and between Hecla Mining Company, a Delaware corporation, whose address is 6500 Mineral Drive, Coeur d'Alene, Idaho 83815-8788 (hereinafter referred to as "Seller"), and Dixie Cable Services, whose address is 31 N. 700 E. #171, St. George, Utah 84770 (hereinafter referred to as "Purchaser").

RECITALS

WHEREAS, Seller is the owner of certain mineral rights, surface rights and improvements which are located in Township 36 South, Range 17 West, Southeast Quarter Section 2, Iron County, Utah, and which are more particularly described in Exhibit "A", attached hereto and by this reference made a part hereof, hereinafter referred to as the "Property".

WHEREAS, Seller wishes to sell to Purchaser and Purchaser wishes to purchase from Seller the Property, subject to a reserved easement to Seller for ingress and egress to access the tailings impoundment and to monitor water wells owned by Seller, all on the terms and conditions contained herein;

NOW, THEREFORE, in consideration of the foregoing and the following mutual benefits and the promises and considerations herein exchanged, the parties, intending to be legally bound, do hereby agree as follows:

AGREEMENT

1. Agreement to Purchase and Sell. Subject to the terms and conditions of this Agreement, Purchaser agrees to purchase and Seller agrees to sell the Property, specifically including all equipment and inventory located at the property "as is, where is"; and specifically reserving an easement for ingress and egress through the Property on the existing roadways to access Seller's property adjacent to said Property; and specifically excluding all capital credits from Dixie Escalante R.E.A.

2. Purchase Price; Closing; Closing Costs; Conditions of Closing.

A. Purchaser agrees to pay to Seller in cash, certified check or cashiers check at closing, the sum of One Hundred ~~Eleven~~ Thousand Dollars (U.S.) \$125,000.00 for the Property (hereinafter referred to as the "Purchase Price"). Purchaser also agrees to pay a non refundable deposit of \$10,000, payable to Seller at the time of execution of this Agreement which shall be applied to the Purchase Price.

\$125,000.00

B. Closing of the transactions contemplated by this Agreement shall be accomplished on December 31, 1998, or within thirty (30) days of the time cleanup specified under paragraph 2(d) below has been completed, whichever is earlier ("Closing Date"). At such time Purchaser shall deliver to Seller the balance of the Purchase Price in exchange for Seller delivering to Purchaser a fully executed Quitclaim Deed substantially in the form attached hereto as Exhibit B. Closing may be accomplished in one of the following manners, in Sellers' sole discretion: either (i) in person or (ii) by Purchaser first transferring funds by electronic interbank wire transfer in exchange for which Seller shall then deliver a facsimile of this executed Quitclaim Deed to Purchaser via telecopier and mailing the original deed to Purchaser via certified mail, return receipt requested.

C. Purchaser assumes liability for and agrees to pay all state and local property taxes, levies and assessments, after July 1, 1998. Purchaser and Seller shall equally share document-recording fees and title search fees.

D. As further consideration for acquiring the Property, Purchaser shall bear the cost of an Environmental Survey ("Survey") a description of the scope of which is attached hereto as Exhibit "C" and incorporated herein by this reference. In addition, Purchaser agrees at its sole expense, to complete the mill site clean-up ("Clean-Up") by December 31, 1998 in a manner sufficient to meet the requirements specified in the Survey. Clean-up shall also be conducted in accordance with sound engineering and environmental practices; and applicable federal, state and local laws, regulations and ordinances. Time is of the essence for completion of the Clean-up.

E. Conditions of Closing.

(1) Buyer. At or before Closing Date Buyer shall:

- (i) Complete the Clean-up in accordance with Section 2(D) of this Agreement.
- (ii) Deliver to Seller the balance of the Purchase Price in cash, certified check, cashiers check or by electronic interbank wire transfer.

(2) Seller. At or before Closing Date Seller shall deliver to Buyer:

- (i) A fully executed Quitclaim Deed substantially in the form as attached hereto at Exhibit "B"; and
- (ii) Appropriate documentation from the Utah Department of Oil, Gas and Minerals regarding future industrial land use.

3. Representations and Warranties.

A. Purchaser expressly acknowledges and agrees that Seller has made no representation or warranty concerning its right, title or interest in or to the Property, or the type, quality or condition of any improvements or appurtenances thereto. Purchaser further acknowledges that Seller has disclosed that title is in dispute and the U.S. Bureau of Land Management (BLM) claims ownership. Seller also claims ownership to the Property pursuant to a deed from the State of Utah dated August 21, 1980. The BLM and State of Utah are working on a land exchange that involves the Property and should resolve the title issue. Seller agrees to use its best efforts in assisting Dixie Cable to resolve such title dispute and to assign all right, title and interest to any and all causes of action, claims and rights related thereto.

B. Purchaser expressly acknowledges, represents and warrants that it is familiar with the title to the Property and the type, quality and condition of any and all improvements and appurtenances thereto by virtue of its inspection on February 5, 1998.

4. Disclosures. Purchaser expressly agrees to accept the Property in an "as is" condition. Purchaser acknowledges that the Property was previously used for mining, milling and mineral exploration purposes and the soil, surface water and groundwater is or may be contaminated with mill tailings, mine wastes and other regulated substances. Ore materials, mill tailings, mining waste rock and other regulated substances (collectively "Materials") located on the Property are known to fail the EPA TCLP characterization test as set forth in 40 CFR § 261.24. These Materials are excluded from regulation as hazardous waste when utilized for mining purposes, but may be subject to regulation under the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6921 et. seq.; and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 42 U.S.C. § 9601 et. seq. if used for purposes other than mining.

5. Indemnity, Waiver and Release.

A. Indemnity

(i) **Indemnity by Purchaser.** Purchaser shall defend, indemnify and hold harmless the Seller, its officers, directors, successors and assigns against all damages, claims, losses, liabilities, costs and expenses which arise in whole or in part, out of the Purchaser's operations at the Property subsequent to the Closing Date, and the breach of the representations and warranties, the covenants and agreements which survive closing pursuant to Section 8 (G).

(ii) **Indemnity by Seller.** Seller shall defend, indemnify and hold harmless Purchaser, its officers, directors, successors and assigns against all damages, claims, losses, liabilities, costs and expenses, which arise in whole or in part, out of the Seller's breach of any representations,

- (ii) lease, mortgage, or otherwise encumber any of the Real Property, Plant and Equipment, or other assets of the Property; or
- (iii) enter into discussions or negotiations with any third party concerning the purchase of the Property prior to the Closing Date, or grant options or rights, or enter into any contract or commitment to purchase any of the Property.

(2) Further Assurances. Purchaser will diligently prepare, execute and deliver such instruments and take such action as Seller may reasonably request in order to effect the transactions contemplated by this Agreement.

(3) Confidentiality. In the event of the termination of this Agreement, Purchaser shall promptly return to Seller all documents, work papers, and other material obtained by Purchaser or on its behalf from Seller or Seller's representatives as a result of this Agreement or in connection herewith, whether so obtained before or after the execution hereof, and Purchaser shall not retain any copy or other reflection of any such documents work papers and other material. Purchaser shall at all times prior to the Closing Date, and in the event of termination of this Agreement cause any information so obtained to be kept confidential and will not use, or permit the use of, such documents, work papers and other materials in its business or in any other manner or for any other purpose, unless such information (i) becomes generally available to the public other than as a result of a disclosure by Seller and its representatives, (ii) was available to Purchaser on a non-confidential basis prior to its disclosure to Purchaser by Seller or its representatives, or (iii) becomes available to Purchaser on a non-confidential basis from a source other than Seller or its representatives, provided that such source is not bound by a confidentiality agreement with Seller or its representatives.

B. Between the date hereof and continuing after Closing Date, Purchaser further covenants and agrees that the Materials referenced in Section 4 above shall not be removed from or redistributed within the Property. It is the express intent of the parties that this covenant shall attach to and run with the land.

8. General Provisions.

A. This Agreement shall be governed by the laws of the state of Utah.

B. This Agreement represents the entire Agreement and sole understanding among the parties with respect to the Property, and no amendment or alteration of the terms of this Agreement shall be effective unless set forth in writing signed by each of the parties to this Agreement.

C. Time is of the essence in the performance of the terms of this Agreement.

D. This Agreement shall inure to the benefit of and be binding upon the parties hereto and its respective heirs, successors and assigns.

E. Any notice required or permitted hereunder shall be in writing and delivered by certified or registered mail, return receipt requested, and shall be effective when received at the address of the parties reflected above. Either party may change its address by delivering written notice thereof to the other party.

F. In the event that the transactions contemplated by this Agreement are not completed on or before December 31, 1998, this Agreement shall be deemed to have expired and shall not be binding upon or enforceable against either party hereto. Dixie agrees that it shall forfeit all amounts expended for the Clean-up and shall not be entitled to reimbursement from Hecla if the Clean-up and Closing is not completed by December 31, 1998.

G. The representations and warranties set forth in Section 3, covenants in Section 7 (B) and agreements in Section 5 (A) and (B) shall survive Closing Date and shall not merge into any of the deeds, assignments or other instruments delivered at closing.


H. The prevailing party in any dispute arising under this Agreement shall be entitled to an award of reasonable attorneys' fees and costs.

IN WITNESS WHEREOF the parties hereby have executed this Agreement as of the date first above written.

PURCHASER:

DIXIE CABLE SERVICES

By: _____



JAMES B. PAULEY

(Print Name)

PRESIDENT

Title

SELLER:

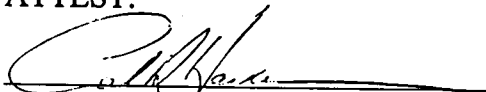
HECLA MINING COMPANY

By: _____




Michael B. White
Vice President

ATTEST:



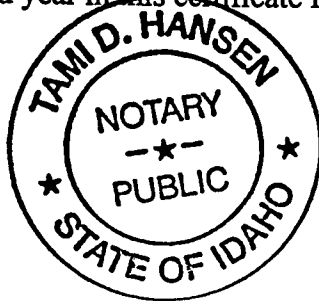
ATTEST:


Nathaniel K. Adams
Assistant Secretary

STATE OF IDAHO)
) ss.
COUNTY OF KOOTENAI)

On this 18th day of September 1998, before me, the undersigned, a Notary Public in and for the State of Idaho, personally appeared Michael B. White and Nathaniel K. Adams, known or identified to me to be the Vice President-General Counsel and Assistant Secretary, respectively, of Hecla Mining Company, the officers who executed the instrument on behalf of said corporation, and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal the day and year in this certificate first above written.

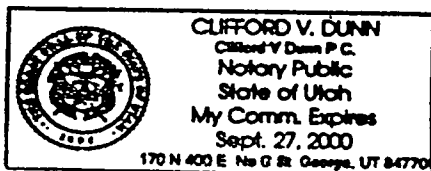


Tami D. Hansen
Notary Public
Residing at 465 Orchard, WA
My Commission Expires: 9-12-2003

STATE OF UTAH
Washington ss.
COUNTY OF IRON)

On this 14th day of September 1998, before me, the undersigned, a Notary Public in and for the State of Utah, personally appeared Taron Paulsen, known or identified to me to be the President of Dixie Cable Services, the authorized individual who executed the instrument on behalf of said company, and acknowledged to me that such company executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal the day and year in this certificate first above written.



[Signature]
Notary Public
Residing at _____
My Commission Expires: _____

EXHIBIT "A"
to Real Estate Purchase and Sale Agreement
Hecla to Dixie Cable

REAL PROPERTY:

The S½ of SW¼; SE¼; SE ¼ of NE ¼; and E ½ of SW ¼ of NE ¼, all of Section 2, Township 36 South, Range 17 West, Salt Lake Base and Meridian, Iron County, Utah. Including the patented mining claims of Mineral Survey 6213: Black Beauty, Silver Bell, Silver Top and the Hyland ("Property"). Said Property contains approximately 320 acres more or less.

EXCLUDING THEREFROM, that parcel of land previously conveyed by Special Warranty Deed to Relient Testing Laboratory, Inc. dated October 23, 1993, recorded in the records of Iron County, Utah on December 9, 1993 as Instrument No. 333443, Book 491, Page 631, described as follows:

Beginning at the Northeast corner of the Southeast Quarter of Section 2, Township 36 South, Range 17 West, Salt Lake Base and Meridian; and running thence South 0° 02' 49" West along the East line of said Southeast Quarter 1,330.82 feet to the Southeast corner of the Northeast Quarter of the Southeast Quarter of said Section 2; running thence South 89° 55' 39" West along the South line of said Northeast Quarter Southeast Quarter 658.96 feet to the Southwest Corner of the East half Northeast Quarter Southeast Quarter said Section 2; thence North 0° 01' 01" West along the West line of the East Half Northeast Quarter Southeast Quarter said Section 2 796.50 feet; thence North 55° 04' 10" West 135.18 feet; North 35° 37' 16" East 59.68 feet; South 55° 12' 03" East 92.61 feet to a point on the West line of said East Half Northeast Quarter Southeast Quarter; running thence North 0° 01' 01" West along said West line 463.07 feet to the Northwest Corner East Half Northeast Quarter Southeast Quarter said Section 2; running thence South 89° 54' 55" East along the North line of said East half Northeast Quarter Southeast Quarter 660.45 feet to the point of beginning and containing 20.325 acres.

EXCEPTING THEREFROM all coal, oil, gas and/or other minerals, in, on, or under said land, from the tracts identified as state Leases 17663 and 17664, together with the right of ingress and egress for the purpose of exploring and/or removing the same.

RESERVING UNTO Seller an easement for ingress and egress over, across and through said Property following and upon the presently existing access roads as depicted upon the attached map in this Exhibit "B", for the purpose of accessing the tailings impoundment and monitoring of wells adjacent to said Property.

SUBJECT TO the terms, conditions and restrictions as set forth in that certain Patent recorded March 6, 1929, as Entry No. 45345 in Book 34 of Mining Deeds at Page 231.

SUBJECT TO waste rock not being removed from or redistributed on the Property.

TOGETHER WITH all improvements and appurtenances thereunto belonging, but SUBJECT to Easements, Rights of Way and Restrictions of Record and those enforceable in law and equity.

FIXTURES/PERSONAL PROPERTY:

The Property includes the following fixtures and personal property:

- 1) A water supply system, including pump and storage tank, and water wells.
- 2) Septic System.
- 3) A 10,000 kva substation
- 4) All buildings, tanks and ponds located on the Property.
- 5) All equipment and inventory.

EXHIBIT "B"
to Real Estate Purchase and Sale Agreement
Hecla to Dixie Cable

FORM OF QUITCLAIM DEED

HECLA MINING COMPANY (hereinafter referred to as "Transferor"), a Delaware corporation qualified to conduct business and in good standing in the State of Idaho, whose address is 6500 Mineral Drive, Coeur d'Alene, Idaho 83815-8788, in consideration of the sum of ten dollars (\$10.00) and other valuable consideration paid to Transferor by _____, (hereinafter referred to as "Transferee"), whose address is _____, hereby acknowledged by Transferor, hereby remises, releases and forever Quitclaims to Transferee all of the interest of Transferor, if any, in and to a parcel of property located in Township _____ North, Range _____ East, Section _____, _____ County, _____, as further described in Exhibit "A" and shown on the map in Exhibit "B", attached hereto and by this reference made a part hereof (hereinafter referred to as the "Property").

TRANSFEEEE ACCEPTS the Property in an "as is" condition. Transferee acknowledges that the Property is or may be contaminated with mill tailings, mine waste and/or other substances. Transferee waives and releases Transferor from all claims, rights, causes of action, whether currently known or as may arise in the future, which seek damages or equitable relief of any kind. These terms shall inure to the benefit of and be binding upon the parties hereto and their respective heirs, successors and assigns.

RESERVING UNTO Transferor an easement for ingress and egress, over, across and through said Property for the purpose of accessing the tailings impoundment and monitoring of wells owned by Transferor and located adjacent to said Property.

SUBJECT TO the terms, conditions and restrictions as set forth in that certain Patent recorded March 6, 1929, as Entry No. 45345 in Book 34 of Mining Deeds at Page 231.

SUBJECT TO waste rock not being removed from or redistributed on the Property.

TO HAVE AND TO HOLD, all and singular the described property, together with the tenements, hereditaments and appurtenances belonging to such property, or in anywise appertaining, and the rents, issues and profits of such property to transferee and Transferee's heirs and assigns forever.

IN WITNESS WHEREOF, Transferor has caused this Quitclaim Deed to be executed this _____ day of _____, 1998.

TRANSFEROR

HECLA MINING COMPANY

By: _____
Michael B. White
Vice President

ATTEST:

By: _____
Nathaniel K. Adams
Assistant Secretary

ACKNOWLEDGMENT

STATE OF IDAHO)
) ss.
COUNTY OF KOOTENAI)

On this _____ day of _____, 19____, before me, the undersigned, a Notary Public in and for the State of Idaho, personally appeared Michael B. White and Nathaniel K. Adams, known or identified to me to be the Vice President-General Counsel and Assistant Secretary, respectively, of Hecla Mining Company, the officers who executed the instrument on behalf of said corporation, and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal the day and year in this certificate first above written.

Notary Public
Residing at _____
My Commission Expires: _____

EXHIBIT "1"
to Form of Quitclaim Deed
Hecla to Dixie Cable

REAL PROPERTY:

The S½ of SW¼; SE¼; SE ¼ of NE ¼, and E ½ of SW ¼ of NE ¼, all of Section 2, Township 36 South, Range 17 West, Salt Lake Base and Meridian, Iron County, Utah. Including the patented mining claims of Mineral Survey 6213: Black Beauty, Silver Bell, Silver Top and the Hyland ("Property"). Said Property contains approximately 320 acres more or less.

EXCLUDING THEREFROM, that parcel of land previously conveyed by Special Warranty Deed to Relient Testing Laboratory, Inc. dated October 23, 1993, recorded in the records of Iron County, Utah on December 9, 1993 as Instrument No. 333443, Book 491, Page 631, described as follows:

Beginning at the Northeast corner of the Southeast Quarter of Section 2, Township 36 South, Range 17 West, Salt Lake Base and Meridian; and running thence South 0° 02' 49" West along the East line of said Southeast Quarter 1,330.82 feet to the Southeast corner of the Northeast Quarter of the Southeast Quarter of said Section 2; running thence South 89° 55' 39" West along the South line of said Northeast Quarter Southeast Quarter 658.96 feet to the Southwest Corner of the East half Northeast Quarter Southeast Quarter said Section 2; thence North 0° 01' 01" West along the West line of the East Half Northeast Quarter Southeast Quarter said Section 2 796.50 feet; thence North 55° 04' 10" West 135.18 feet; North 35° 37' 16" East 59.68 feet; South 55° 12' 03" East 92.61 feet to a point on the West line of said East Half Northeast Quarter Southeast Quarter; running thence North 0° 01' 01" West along said West line 463.07 feet to the Northwest Corner East Half Northeast Quarter Southeast Quarter said Section 2; running thence South 89° 54' 55" East along the North line of said East half Northeast Quarter Southeast Quarter 660.45 feet to the point of beginning and containing 20.325 acres.

EXCEPTING THEREFROM all coal, oil, gas and/or other minerals, in, on, or under said land, from the tracts identified as State Leases 17663 and 17664, together with the right of ingress and egress for the purpose of exploring and/or removing the same.

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SUBJECT TO the terms, conditions and restrictions as set forth in that certain Patent recorded March 6, 1929, as Entry No. 45345 in Book 34 of Mining Deeds at Page 231.

SUBJECT TO waste rock not being removed from or redistributed on the Property.

TOGETHER WITH all improvements and appurtenances thereunto belonging, but SUBJECT to Easements, Rights of Way and Restrictions of Record and those enforceable in law and equity.

FIXTURES/PERSONAL PROPERTY:

The Property includes the following fixtures and personal property:

- 1) A water supply system, including pump and storage tank, and water wells.
- 2) Septic System.
- 3) A 10,000 kva substation
- 4) All buildings, tanks and ponds located on the Property.
- 5) All equipment and inventory.

EXHIBIT "2"
to Form of Quitclaim Deed
Hecla to Dixie Cable

PROPERTY MAP

See attached map

36 South Range 17 W

22
40 ac.

23
40 ac.

24
40 ac.

E

STATE OF UTAH
DIVISION OF STATE
LANDS

ESCALANTE SILVER
MINES Co. INC.

ESCALANTE SILVER MINES Co. INC.

E 1679.1
308417
186 ac. ±

E. 1629
308451
54.29 ac.

E-1620
208451
54.29 ac.

ESCALANTE SILVER MINES Co. INC.

ESCALANTE SILVER
MINES Co. INC.

E. 1679.1-1
308493
186.05 ac.

E. 1679.1-1
308493
186.05 ac.

557° 32' E. 60'

557° 32' E. 60'
JASON PAULST
MAINT. CABLE SYSTEM
50-E-4114-1
308491
10.11 ac.
Bk 583/264

557° 32' E. 60'
JASON PAULST
MAINT. CABLE SYSTEM
50-E-4114-1
308491
10.11 ac.
Bk 583/264

557° 32' E. 60'

557° 32' E. 60'

557° 32' E. 60'

557° 32' E. 60'

557° 32' E. 60'

557° 32' E. 60'

557° 32' E. 60'

10754 04' G1 0 (162 94 cmins)

N 0° 01' W

Exclv.
Parce

TAIL...

6213
DEENS PG. 251
MINES Co. INC.
308493
186.05 ac.

6213
DEENS PG. 251
MINES Co. INC.
308493
186.05 ac.

430° 28' E 140'
BLACK BEAUTY # 6213
DEENS PG. 251
MINES Co. INC.
308493
186.05 ac.

517° 32' E. 60'
SILVER TOP
1974.5'

NO°01'W 10725' G.L.O. (162.50 Chains)

Sec 2 Twnsl


21
4000STATE OF UTAH DIVISION OF STATE
LANDSSTATE OF UTAH DIVISION OF
LANDSE. 16 29. 1
" 108477
190 Ac ±E. 16 29. 1
" 108477
190 Ac ±

ESCALANTE SILVER MINES CO. INC.

ESCALANTE SILVER MINES

E. 16 29. 1
" 108493
188.05 Ac.E. 16 29. 1
" 108493
188.05 Ac.

Fr. (2nd) = 11.48
 37m (4th) = 11.48
 132m. 4th Fr. (2nd) = 11.48
 139.3
 1 Hyl. 50



== Excluded Parcel

U.S. 100

EXHIBIT "C"
to Real Estate Purchase and Sale Agreement
Hecla to Dixie Cable

ENVIRONMENTAL SURVEY

Purchaser agrees to perform the Survey and clean up set forth in this Exhibit "C" consistent with paragraph 2.D. of this Agreement.

Cleanup Required:

All areas and equipment that handled ore, chemicals, or ore based materials after the addition of chemicals to the ore, must be cleaned and then surveyed to determine that no contaminants above the standards (as specified below). Equipment that can be removed may be properly disposed rather than being cleaned. All chemicals, including those in the laboratory must be removed and properly disposed, or specifically identified as being included in the sale.

The cleanup generally includes:

Areas

Laboratory Building
Mill (Concentrator) Building
Refinery (Bullion Room)
Leach Tank Area
Thickener Area
Fuel Storage Area
Grounds Surrounding the Buildings

Equipment

All piping, pumps, sumps that contained ore, chemicals or ore material to which chemicals had been added
All tankage that contained ore, chemicals or ore material after chemicals had been added
Equipment that handled or contained chemicals or ore material after chemicals had been added
Thickener, filters, grinding mills
Any remaining refinery equipment, including the exhaust stacks

Buildings

Walls, beams, floors should be washed down/cleaned to remove any contaminants due to the ore or chemicals used at the facility

Grounds

The soils around the mill should be cleaned to remove ore or chemical contaminants

Standards

Solids samples from inside the mill building and from equipment, tanks, pumps, piping, etc., will be analyzed for total metal for those metals on the TCLP listing (40 CFR 261.24: arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver). The results will be compared to the TCLP limits. If the amount of metal (total metal) does not exceed the TCLP limit for that metal, the sample passes the cleanup standard. If the amount of a metal exceeds the TCLP limit, cleanup can continue or the sample could be reanalyzed using the TCLP procedure for that sample. If the result from TCLP analysis does not exceed the TCLP limit, the sample would pass the cleanup standard. Otherwise, cleanup needs to continue or the material shipped for proper disposal.

Soil samples from the grounds outside the mill will be analyzed for total metal (for those metals on the TCLP listing) and the results adjusted for background. The results including background will not exceed 100 ppm for arsenic, 2000 ppm for barium, 20 ppm for cadmium, 100 ppm for chromium, 100 ppm for lead, 4 ppm for mercury, 20 ppm for selenium and 100 ppm for silver.

Petroleum contaminated samples should be analyzed for TPH and for BTEXN and must pass the cleanup level of 100 mg/kg.

Solid (and liquid samples, if any) will be analyzed for total cyanide and/or weak acid dissociable (WAD) cyanide. Solid samples will not exceed 50 ppm total cyanide or 10 ppm WAD cyanide (either standard may be used) and liquid samples will not exceed and 4 ppm WAD.

m4021/009

Southern Utah Tire Recyclers

1410 S. 2400 W.
Beryl, Utah 84714
(801) 652-1639

Date: January 7, 1997

To: D. Wayne Hedberg
Permit Supervisor
Dept. of Natural Resources
Division of Oil, Gas and Mining
Minerals Reclamation Program
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114-5801
(801) 538-5286 (801) 359-5286 FAX

*Returns
4/12/03*

re: Letter of Explanation

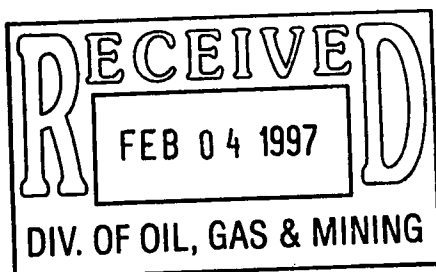
Dear Mr. Hedberg:

Enclosed is our Business Plan and Plan of Operations which was submitted to Iron County for final approval to become a waste tire recycling plant as well as a Commercial Greenhouse facility. This Business Plan reflects our proposal to recycle tires for the recovery of heat for our Greenhouse Operations. It was proposed to place both facilities on the old Reliant Testing site. The plan of Operations reflects our current patented tire recycling process of Gasifying tires for the recovery of heat for our Greenhouse facility. The Plan of Operations also includes the proposal to expand our operations to the Hecla Mine buildings.

We desire to separate the waste tire recycling plant from the Greenhouse facility in the near future by moving the recycling plant to the Hecla site. It is also in our plans to install an updated recycling process that will dispose of a much larger quantity of tires and will not only provide the heat for the Greenhouse operations but will actually extract the tire components out. With this process, we will be able to recover Carbon Black, fuel oils and high tensile steel that will be sold, increasing the profitability of the recycling aspect of the business. This process will increase the tire consumption rate 10 fold, increasing it from 100,000 tires to 1,000,000 tires per year, and it will also allow the expansion of the Greenhouse business proportionately by allowing the additional heat to be used for the Greenhouses.

Due to the varied weather conditions and to the nature of the tire pyrolysis process, we would want to install it inside the existing mill building at Hecla so that the process might be managed more appropriately, providing a controlled environment.

If you have any questions about our proposed plans, please feel free to call me, I would be happy to answer them. Thank you.



Sincerely,

Nick Bird

Nick Bird
Southern Utah Tire Recyclers

Proposed Plan of Operations
for
Southern Utah Tire Recyclers
and
Agricultural Dynamics

Southern Utah Tire Recyclers and Agricultural Dynamics

Description of Proposed Plan of Operations

The following is a summary of the proposed plan of operations for the Agricultural Dynamics Project and an explanation of the expected sequence, schedule, size and purpose of both the Southern Utah Tire Recyclers and Agricultural Dynamics Operations.

This plan of operations describes the activities that are proposed to take place under the Conditional Use Permit requested from Iron County. This plan will show how the operator proposes to comply with performance standards, air quality restrictions, stipulations, or conditions applicable to the Conditional Use Permit. It will also include the number of people and size of equipment, necessary for the project; the amount of material to be processed and how it will be processed; the method of disposal of any left-over material or debris from the tire burning operation; the actions to be taken to avoid or minimize any detrimental effects on air and water quality; the amount and source of water to be used, and the operator's plans for compliance with other applicable laws and regulations under the jurisdiction of Iron County and the State of Utah.

1. The sequence of events is expected to go as follows:
 - a. Approval of Conditional Use Permit by Iron County Commission after review of permits currently granted by Dept. of Environmental Air Quality for relocation and operation of Tire Gasification Unit, as well as local and state registration as a Tire Recycling facility. Posting of a bond as required by the State of Utah, local Health Board, or County Commission.
 - b. Comply with State Regulations governing Waste Tire Piles, R315-314-3. (See Addendum A)
 1. Limit individual tire piles to a maximum of 5,000 square feet of continuous area in size at the base of the pile.
 2. Limit the individual tire piles to 50,000 cubic feet in volume or 10 feet in height.
 3. Insure that piles be at least 40 feet from the perimeter of the property and 50 feet from any building.
 4. Provide for a 40 foot fire lane between tire piles.
 5. Effect a vector control program, if necessary, to minimize mosquito breeding and the harboring of other vectors such as rats or other animals.
 6. Provide on-site fire control equipment that is maintained in good working order.

7. Display an emergency procedures plan and inspection approval by the local fire department and require all employees to be familiar with the plan.
8. Accumulate tires only in designated areas.
- c. Upon condition of receiving all Permits from local and State agencies, construction of one 32' X 100' Greenhouse will begin on-site. Transfer of 2.5 Acre feet of water to well on location. Begin construction of a heat exchange system including a boiler unit and applicable plumbing for heating the Greenhouses and main building. Assembly of 1700 square foot walk-in cooler inside main building. Establishment of contracts with several tire stores to begin Gasification Process.
- d. The initial personnel required including administration and construction processes are estimated to be 6.
- e. Sequence of Events for Gasification Process.
 1. Establishing tire collection process pursuant to Health Code Title 26 Chapter 32A, Waste Tire Recycling Act
 2. The utilization of permitted Gasification Unit, per State Approval (See addendum B), to begin heating processes of building and Greenhouse.
 - A. The initial number of tires permitted under addendum B to be disposed of is 70 per day.
 - B. Remaining Debris disposed of as follows:
 - Steel will be bailed and initially sold as per agreement to Red Blake Salvage in St. George.
 - Carbon Black will be loaded into 1 ton ore bags and shipped to R.D. Services in California.
 - C. No Debris will be stockpiled on-site.
 3. Construction of larger tire gasification Unit on-site, size of unit will depend on engineering scale-up estimates and results of tests already taken from smaller unit.
 - A. The necessity of a larger unit is because of greater energy demands of additional Greenhouses.
 4. The notice of Intent for the Larger Unit will be submitted as required by Dept. of Air Quality within 60 days of startup. An additional 120 days will be for public meetings and testing, as required by the Dept. of Air Quality.
 - A. This Larger Unit is expected to recycle approx. 100,000 tires per year and will conform to all Utah Dept. of Air Quality regulations.
 5. Upon approval of Larger Unit, three (3) additional 32' X 100' Greenhouse Units will be constructed on-site. Purchase and installation of steam generator to provide electricity for the greenhouse operation. Sizing of this unit will be determined by the energy needs of the greenhouses and the main building.
 - A. The addition of each Greenhouse is expected to increase the number of employees by 1 per Greenhouse.

- B. Additional water shares will be transferred as needed.
6. If the Hecla Property to the south is obtained, the tire recycling facility will be moved to that location and expanded to fill additional needs. New tire pyrolysis equipment will be installed to recover more of the products from tires rather than just the heat that the current system supplies. These items are Carbon Black, fuel oil and high tensile steel. The Carbon Black will be sold to various carbon brokers, the fuel oil sold to refineries, and the high tensile steel sold to metal recyclers. Approx. 1,000,000 tires per year can be recycled under this process in comparison with 100,000 tires using existing equipment. The Greenhouse operations would be sized up accordingly.
- f. Upon completion of Greenhouses, crops will be planted, harvested and stored in walk-in cooler prior to shipping, and then distributed to already existing accounts, locally and out of state.
- g. Any excess steam generated power not utilized will be sold back to Dixie REA.

R315. Environmental Quality, Solid and Hazardous Waste.

R315-314. Facility Standards for Piles Used for Storage and Treatment.

R315-314-1. Applicability.

(1) This section is applicable to solid waste stored or treated in piles where the solid waste, other than garbage, is in place for more than 90 days and garbage is in place for more than seven days. These standards are also applicable to storing of garbage and sludge in piles, to material derived from waste tires stored in piles, and to tire piles where more than 1000 tires are stored at one facility. The standards for waste tire piles do not apply to permitted waste disposal facilities or municipal landfills that have tire piles.

(2) Other solid wastes stored or treated in piles prior to waste recycling including compost piles of vegetative waste and wood waste are not subject to these standards.

(3) Waste piles stored in fully enclosed buildings are not subject to these standards, provided that no liquids or sludge with free liquids are added to the pile.

(4) Inert waste and construction/demolition waste are not subject to these standards.

(5) The standards of this rule do not apply to industrial solid waste facilities.

R315-314-2. Requirements.

(1) Each owner and operator shall:

(a) comply with the applicable requirements of Section R315-302-2; and

(b) remove all solid waste from the pile at closure to another permitted facility.

(2) Requirements for Solid Waste Likely to Produce Leachate.

(a) Waste piles shall be placed upon a surface such as sealed concrete, asphalt, clay, or an artificial liner underlying the pile to prevent subsurface soil and potential ground water contamination and to allow collection of run-off and leachate. The liner shall be designed of sufficient thickness and strength to withstand stresses imposed by pile handling vehicles and the pile itself.

(b) A run-off collection and treatment system shall be designed, installed and maintained to collect and treat a 25-year storm event.

(c) Waste piles having a capacity of greater than 10,000 cubic yards shall have either:

(i) a ground water monitoring system that complies with Rule R315-308; or

(ii) a leachate detection, collection and treatment system.

(iii) For purposes of this subsection, capacity refers to the total capacity of all leachate-generating piles at one facility, e.g., two, 5,000 cubic yard piles will subject the facility to the requirements of this subsection.

(d) A run-on prevention system shall be designed and maintained to divert the maximum flow from a 25-year storm event.

(e) The Executive Secretary may require that the entire base or liner shall be inspected for wear and integrity

and repaired or replaced by removing stored wastes or otherwise providing inspection access to the base or liner; the request shall be in writing and cite the reasons including valid ground water monitoring or leachate detection data leading to request such an inspection, repair or replacement.

(3) The length of time that solid waste may be stored in piles shall not exceed 1 year unless the Executive Secretary determines that the solid waste may be stored in piles for a longer time period without becoming a threat to human health or the environment.

R315-314-3. Requirements for Waste Tire Piles.

(1) The definitions of Section R315-320-2 are applicable to the requirements for waste tire piles.

(2) The owner or operator of a tire pile facility shall:

(a) submit the following for approval by the Executive Secretary:

(i) a plan of operation as required by Subsection R315-302-2;

(ii) a plot plan of the storage site showing:

(A) the arrangement and size of the tire piles on the site;

(B) the width of the fire lanes and the type and location of the fire control equipment; and

(C) the location of any on-site buildings and the type of fencing to surround the site;

(iii) a financial assurance plan including the date that the financial assurance mechanism becomes effective; and

(iv) a vector control plan;

(b) accumulate tires only in designated areas;

(c) control access to the tire pile site by fencing;

(d) limit individual tire piles to a maximum of 5,000 square feet of continuous area in size at the base of the pile;

(e) limit the individual tire piles to 50,000 cubic feet in volume or 10 feet in height;

(f) insure that piles be at least 40 feet from the perimeter of the property and 50 feet from any building;

(g) provide for a 40 foot fire lane between tire piles;

(h) effect a vector control program, if necessary, to minimize mosquito breeding and the harborage of other vectors such as rats or other animals;

(i) provide on-site fire control equipment that is maintained in good working order;

(j) display an emergency procedures plan and inspection approval by the local fire department and require all employees to be familiar with the plan;

(k) obtain an approval or permit from the local fire department, if required, and be in compliance with all applicable environmental and zoning requirements; and

(l) establish financial assurance for clean-up and closure of the site.

(i) Financial assurance may include insurance, surety bond, trust fund, other mechanism, or combination of mechanisms as approved by the Executive Secretary.

ADDENDUM

"A"

(ii) The amount of financial assurance shall be equivalent to 35 cents per tire stored at the storage site.

(iii) Financial assurance shall be approved by the Executive Secretary and administered by the local health department in which the tire pile is located.

(3) Each tire recycler, as defined by Subsection 26-32a-103(12), that stores tires in piles prior to recycling shall comply with the following requirements:

(a) the owner or operator shall submit the information required in Subsection R315-314-3-2(a);

(b) the tire pile site shall be in compliance with the requirements of Subsections R315-314-3-2(b) through (f);

(c) tires stored for recycling inside a building are not required to comply with the requirements of Subsections R315-314-3-2(d) through (g);

(d) the amount of financial assurance required by Subsection R315-314-3-2(f) of this section shall be equivalent to 35 cents per tire held as the average inventory during the preceding year of operation; and

(e) recycle and move from the site at least 75% of the tires entering the site during the calendar or fiscal year. An owner or operator not meeting this requirement will no longer be considered to be operating a storage site for recycling, and compliance with all requirements for tire piles will be required.

KEY: solid waste management, waste disposal
1995

19-6-104

19-6-105

19-6-108



DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY

Michael O. Leavitt
Governor
Dianne R. Nielson, Ph.D.
Executive Director
Ursula K. Trueman
Director

150 North 1950 West
P.O. Box 144820
Salt Lake City, Utah 84114-4820
(801) 536-4000 Voice
(801) 536-4099 Fax
(801) 536-4414 T.D.D.

December 23, 1996

DAQC-2195-96

Nick Bird
Southern Utah Tire Recyclers
31 North 700 East Suite 223
St. George, Utah 84770

Dear Mr. Bird:

Re: Southern Utah Tire Recyclers (SUTR) - Temporary Relocation/Operation - Notice of Intent (NOI) - ES&M 200 SN#206 Portable Soil Decontamination Unit (Tire Gasification Unit) - Iron County

Your NOI dated December 6, 1996, to relocate your ES&M 200 SN#206 portable soil decontamination unit (tire gasification unit), to the project located at 1410 South 2400 West, Beryl, Utah, was received by the Division of Air Quality (DAQ) on December 6, 1996, and has been reviewed.

Approval is granted to relocate and operate this portable equipment at the new location for a period not to exceed 180 consecutive days. Approval is subject to the conditions of the enclosed Approval Order (AO) dated January 25, 1996 (DAQE-044-95). Approval is also subject to the following operational provisions:

1. Unit #206 will be used for tire gasification to produce fuel to heat water and generate power.
2. Propane fuel will be used for about 15 minutes to start the tire gasification process.
3. Each batch process will gasify on average no more than 15 tires.
4. No more than 70 tires will be gasified daily.
5. SUTR will comply with all other conditions of the above referenced AO.
6. SUTR shall submit an Iron County Conditional Use Permit to DAQ prior to the startup of operations.
7. SUTR will notify DAQ at the startup of this unit at this location.
8. SUTR will test the emissions of TSP, PM10, SO2, NOx, CO, and HC from this unit within 45 days of the startup of operations.
9. SUTR will submit the test protocol to DAQ for approval two weeks prior to testing
10. SUTR will submit a NOI for a permanent location to DAQ within 60 days of startup.
11. SUTR's NOI shall include the results of the emissions testing including pound per hour of each pollutant tested and all other associated operating parameters, as well as the number of units that SUTR will propose for the permanent operation.

The owner/operator shall maintain records of the actual operation hours of the above referenced equipment at this relocation site and submit the information to the DAQ at the completion of this project. For your convenience, a business reply envelope has been enclosed for this purpose. Please make certain that the plant operator is aware of all the site specific requirements for this location and the conditions of the aforementioned AO.

ADDENDUM "B"

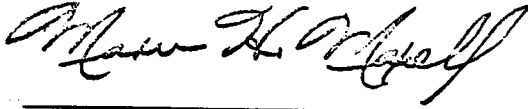


DAQC-2195-96

Page 2

This approval for relocation in no way releases the owner or operator from any liability for compliance with all other applicable federal, state, and local regulations including the Utah Air Conservation Rules.

Sincerely,
Ursula K. Trueman, Executive Secretary
Utah Air Quality Board



Marvin H. Maxell, Manager
Air Standards Branch

MHM:SPW:tj

Enclosure: AO dated January 25, 1996
Submitted Temporary Relocation Form
Business Reply Envelope

cc: Southwest Utah Public Health Department

APPLICATION FOR

CONDITIONAL USE PERMIT

BY

SOUTHERN UTAH TIRE RECYCLERS &

AGRICULTURAL DYNAMICS

IRON COUNTY



Utah Tire Recycler Registration Certificate

Certificate No. TKR9605

The following has registered as a waste tire recycler with the Utah
Division of Solid and Hazardous Waste pursuant to Utah
Administrative Code R315-320-4.

Issued to: Southern Utah Tire Recyclers LLC

On: November 14, 1996 Expires on: November 13, 1997

Approved by:

Deborah J. Moore
Executive Secretary, Utah Solid and Hazardous Waste Control Board



Utah Tire Transporter Registration Certificate

Certificate No. TR9612

*The following has registered as a waste tire transporter with the
Utah Division of Solid and Hazardous Waste pursuant to Utah
Administrative Code R315-320-3.*

Issued to: Southern Utah Tire Transport LLC

On: November 14, 1996 Expires on: November 13, 1997

Approved by:

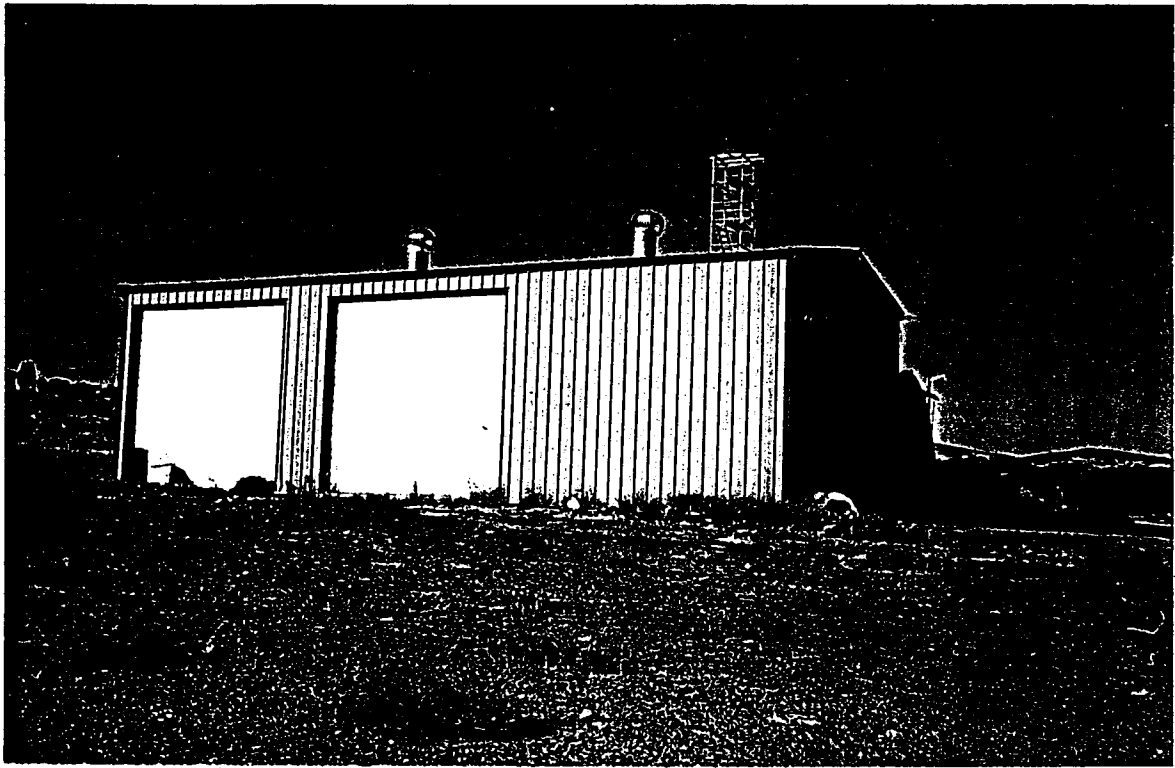
Executive Secretary, Utah Solid and Hazardous Waste Control Board

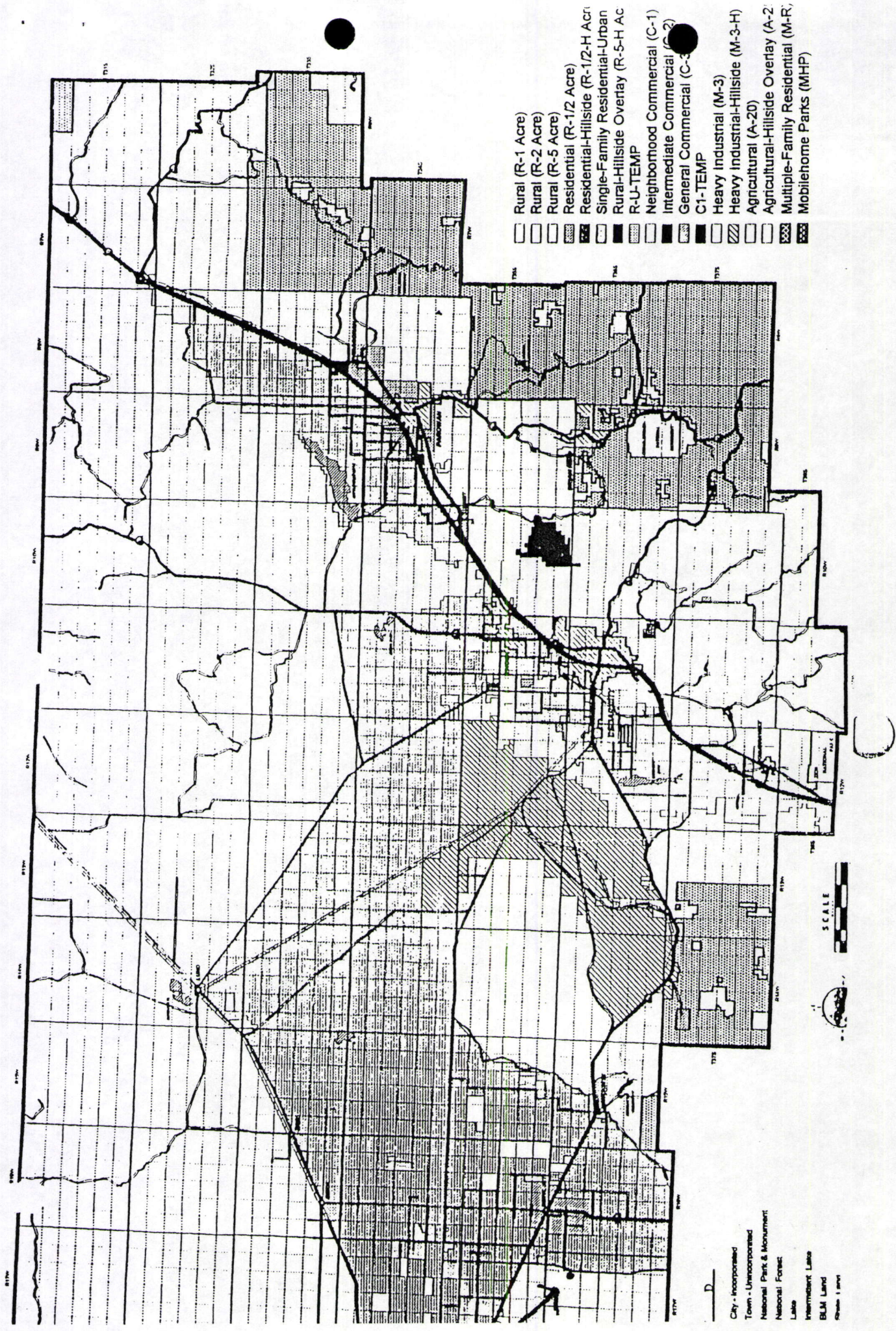
LEGAL DESCRIPTION

Beginning at the Northeast corner of the Southeast Quarter of Section 2, Township 36 South, Range 17 West, Salt Lake Base and Meridian; and running thence South 0 02'49" West along the East line of said Southeast Quarter 1,330.82 feet to the Southeast corner of the Northeast Quarter of the Southeast Quarter of said Section 2; running thence South 89 55'39" West along the South line of said Northeast Quarter of the Southeast Quarter 658.96 feet to the Southwest corner of the East half of the Northeast Quarter of the Southeast Quarter of said Section 2; thence North 0 01'01" West along the West line of the East half of the Northeast Quarter of the Southeast Quarter of said Section 2, 796.50 feet; thence North 55 04'10" West 135.18 feet; thence North 35 37'16" East 59.68 feet; thence South 55 12'03" East 92.61 feet to a point on the West line of said East half of the Northeast Quarter of the Southeast Quarter; running thence North 0 01'01" West along said West line 463.07 feet to the Northwest corner of the East half of the Northeast Quarter of the Southeast Quarter of said Section 2; running thence South 89 54'55" East along the North line of said East half of the Northeast Quarter of the Southeast Quarter 660.45 feet to the point of beginning.

AFFECTS THAT PROPERTY LYING OUTSIDE OF THE PATENTED MINING CLAIMS:

EXCEPTING THEREFROM all coal, oil, gas and/or other minerals, in, on or under said land, together with the right of ingress and egress for the purpose of exploring and/or removing the same.





City - Incorporated
 Town - Unincorporated
 National Park & Monument
 National Forest
 Lake
 Interim Land
 BLM Land
 Road - 1 mile

die Range

Lund

Beryl

Modena

CEDAR CIT

Open Pit
Iron Mine

Subject

BERYL
JUNCTION

Enterprise

Newcastle

Kanarraville

New Harmony

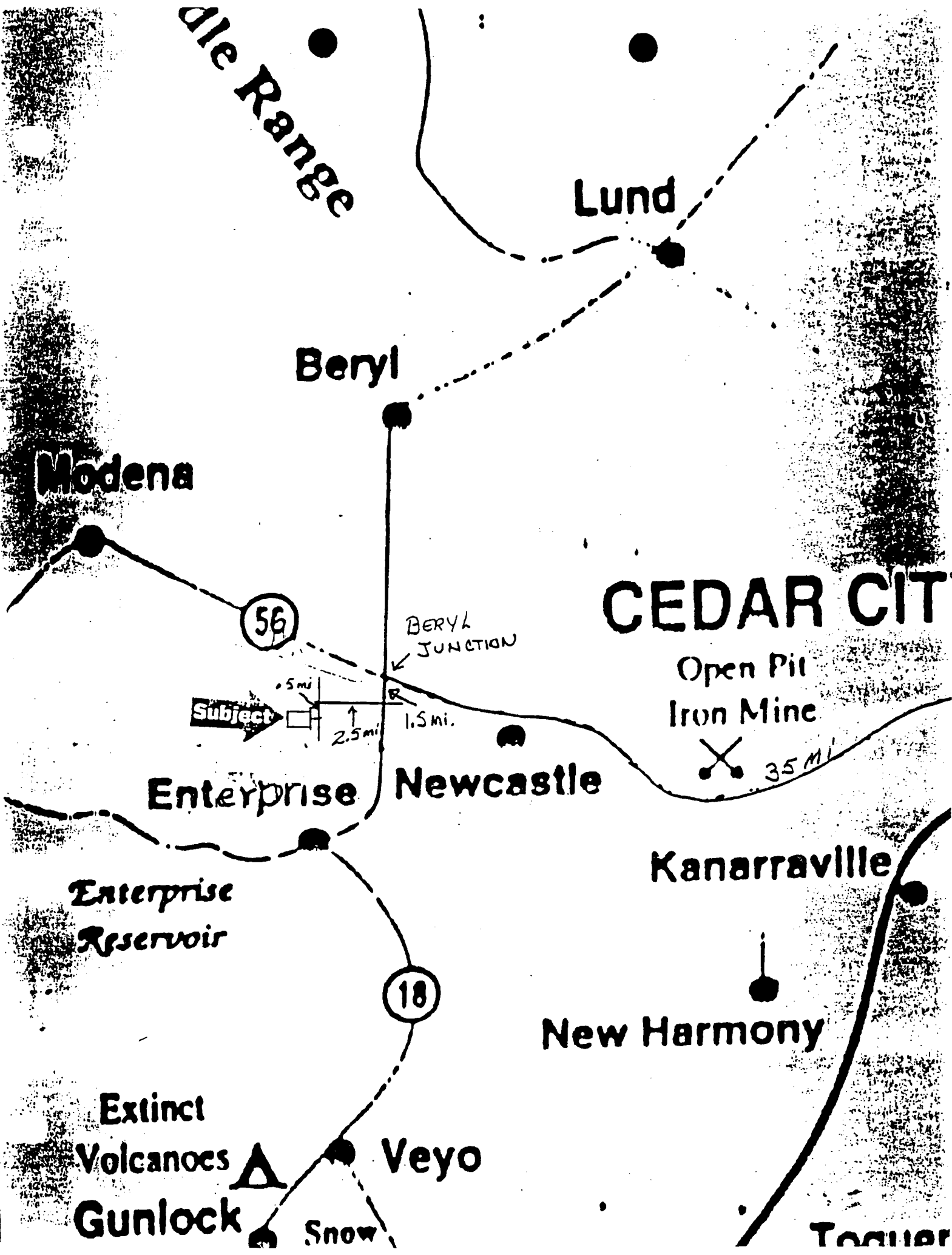
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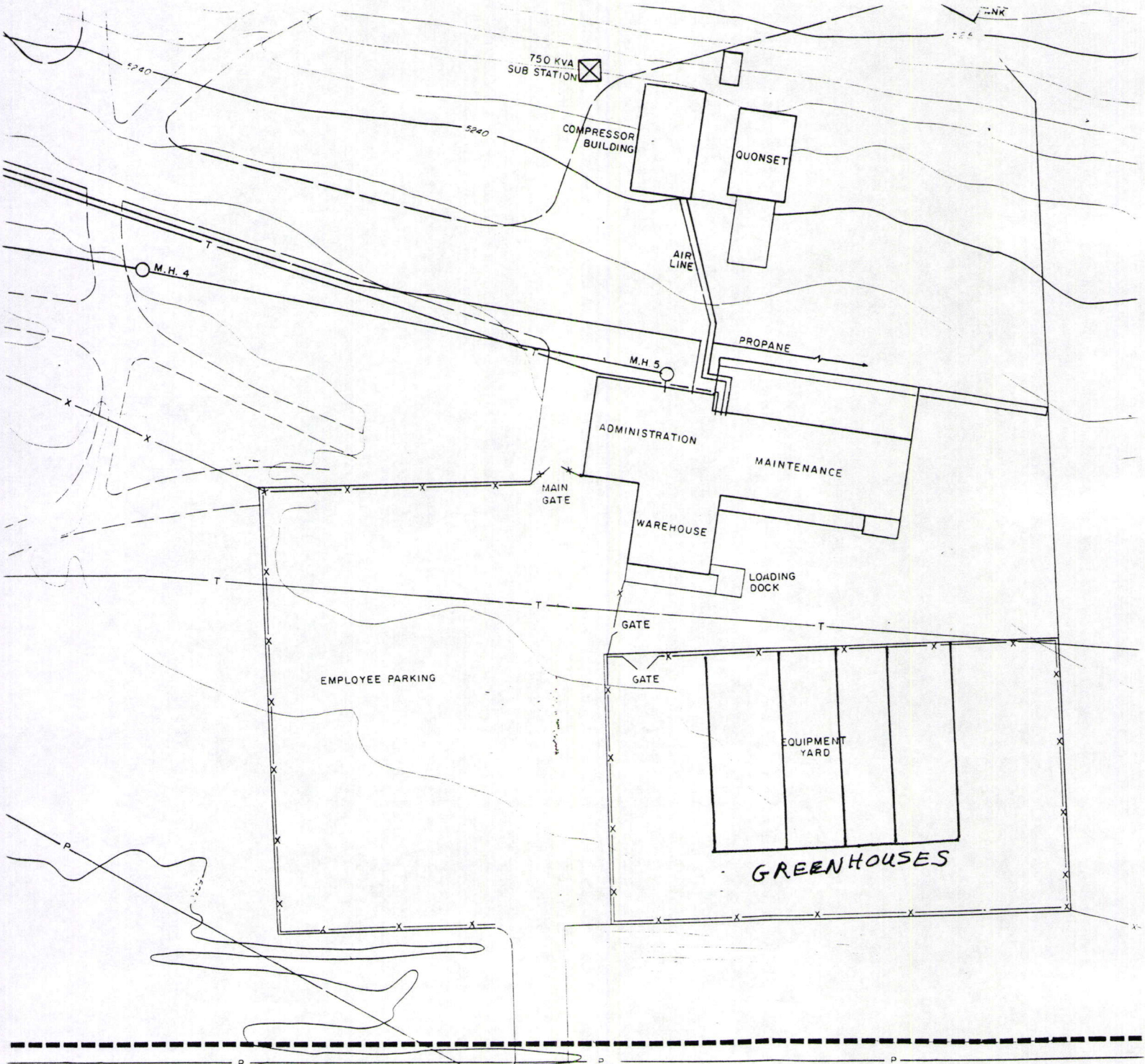
Extinct
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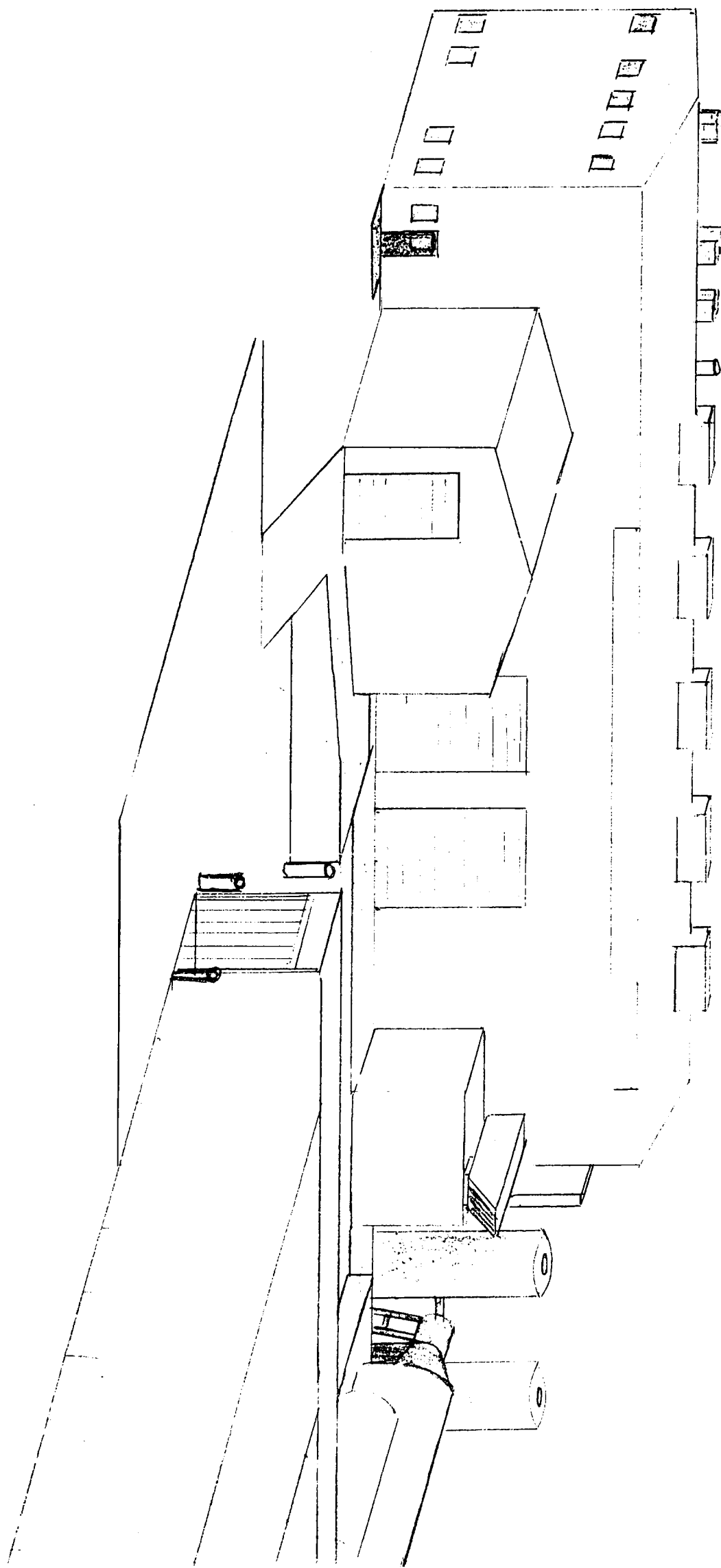
Veyo

Snow

Togher







[54] TIRE GASIFICATION UNIT

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Evanston, Wyo. 82931

[21] Appl. No.: 972,850

[22] Filed: Nov. 6, 1992

[51] Int. Cl.³ F23G 5/12

[52] U.S. Cl. 110/229; 110/212;
110/346; 48/197 R

[58] Field of Search 110/229, 346, 211, 212,
110/214; 431/5; 48/111, 209, 197 R

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Primary Examiner—Edward G. Favors
Attorney, Agent, or Firm—M. Reid Russell

[57] ABSTRACT

A method and apparatus for gasifying tires comprises a housing divided into a tire hopper and vaporization chamber into which air and combustible fluid are inserted through intake manifolds to initially combust and thereafter oxidize tires placed in the housing. Oxidation results in volatile gases and solid residue. The latter is removed through a hatch in the vaporization chamber and the former is shunted to a mixing chamber which comprises an outer compartment, a middle compartment, and an inner compartment. The middle compartment receives the volatile gases which are then mixed with air in the outer and inner compartments. The mixture is combusted with the aid of a combustible fluid mixed in and thereafter shunted to a combustion chamber which further mixes the combustible fluid by means of baffles to thoroughly combust the mixture.

20 Claims, 2 Drawing Sheets

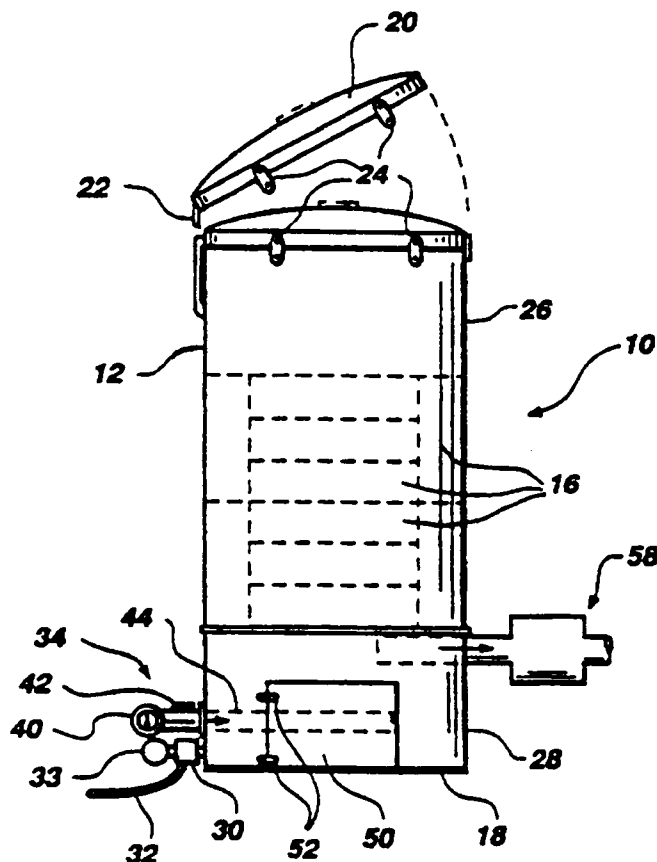


Fig. 1

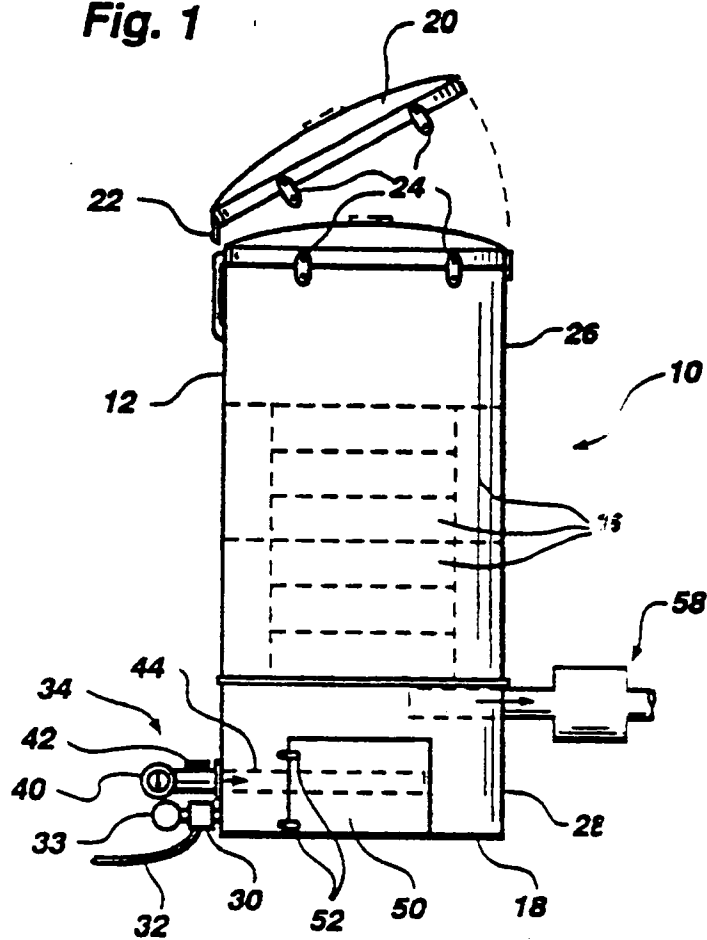
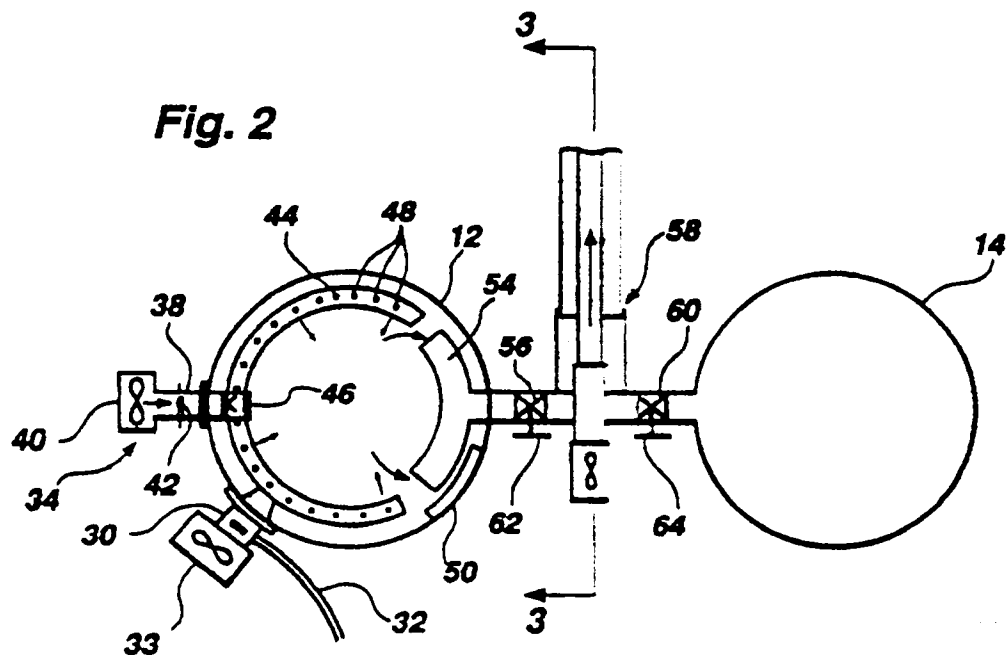


Fig. 2



TIRE GASIFICATION UNIT

FIELD OF THE INVENTION

The present invention concerns the field of waste disposal, and particularly the proper disposal and incineration of used motor vehicle tires so as to minimize pollutants and residue and maximize energy output.

BACKGROUND OF THE INVENTION

The proper disposal of vehicle tires has long been a problem in recent years with the proliferation of motor vehicles and the subsequent increase in used tires. Even the casual observer can tell tales of seeing huge piles of tires in gas stations, junkyards, and the like. Though used tires have rapidly increased in number, the methods for their disposal have not kept pace with their increasing numbers. What is more, the usual methods of disposal occasion considerable damage to the environment. The need for proper disposal is illustrated by the many states now paying up to one dollar per tire to terminal disposers pursuant to the National Scrap Tire Act.

Open burning of tires is undesirable because of the large amounts of resulting carbon and pollutants released into the air. Methods have been developed whereby tires are incinerated in closed housings and in which resulting pollutants are minimized, but many of these methods require that the tires be shredded beforehand in order to fully combust. Shredding requires a large expenditure of time and energy and therefore minimizes or eliminates the net amount of useful energy which may result from tire incineration.

Though closed tire incineration methods are more desirable than those conducted in the open air, all methods continue to rely on simple combustion of the tires or similar processes. Such methods are inefficient, often necessitating shredding, and leave large amounts of solid waste residue and produce harmful gases such as carbon monoxide.

OBJECTS AND SUMMARY OF THE INVENTION

It is therefore an object of the present invention to overcome the shortcomings of the prior art.

It is a further object of the invention to provide a portable process in which intact tires are efficiently and completely gasified and thus eliminated without the need for antecedent shredding, with a minimum of resulting harmful gases, solid residue, and pollutants.

It is a further object of the invention to provide an apparatus for carrying out the inventive process.

In accordance with a first aspect of the invention, a process of vaporizing tires comprises the steps of: placing an intact tire in a substantially airtight housing; supplying a predetermined amount of combustible fluid, preferably a gas, to the housing to initiate oxidation of the tire; supplying a predetermined amount of oxygen into the housing; igniting the combustible fluid, causing initial combustion of the combustible fluid and subsequent oxidation of the tire; and allowing additional oxygen into the housing at a controlled rate quickly enough to continue oxidation of the tire and slowly enough to prevent further combustion, thereby anaerobically vaporizing the tire and causing volatile gases to be released from the tire.

In accordance with a second aspect of the invention, a method is provided for mixing volatile gases with air

in a mixing chamber comprising an elongate outer compartment, an elongate middle compartment disposed substantially wholly within the outer compartment and having an open end feeding into the outer compartment, and an elongate inner compartment disposed substantially wholly within the middle compartment and having an open end feeding into the middle compartment. The method comprises the steps of: supplying air into the inner compartment; supplying volatile gases into the middle compartment; supplying air into the outer compartment; forcing the air in the inner compartment through the open end thereof into the middle compartment, thereby mixing the air in the inner compartment with the volatile gases in the middle compartment; and forcing the mixture of volatile gases and air in the middle compartment through the open end thereof into the outer compartment, thereby mixing the mixture of volatile gases and air in the middle compartment with the air in the outer compartment.

In accordance with a third aspect of the invention, an apparatus for vaporizing tires, resulting in volatile gases and solid residue, comprises: a vaporization chamber; an air intake leading into the vaporization chamber; a combustible fluid intake leading into the vaporization chamber; and a volatile gases withdrawal manifold leading out of the vaporization chamber.

In accordance with a fourth aspect of the invention, an apparatus for vaporizing and gasifying tires comprises: a vaporization chamber for vaporizing tires resulting in volatile gases; a mixing chamber disposed in series with the vaporization chamber for receiving and mixing of the volatile gases; an outer compartment disposed in the mixing chamber adapted for mixing of the volatile gases with air; a middle compartment disposed substantially within the outer compartment and adapted for reception of the volatile gases from the vaporization chamber; an inner compartment disposed substantially within the middle compartment and adapted to force air into mixture with the volatile gases contained in the middle compartment; a combustion chamber disposed in series with the mixing chamber and adapted to receive the air/volatile gases mixture; and baffles disposed within the combustion chamber adapted to further mix the mixture and thoroughly combust it.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects, aspects, and embodiments of the present invention will be described with reference to the attached drawing figures, of which:

FIG. 1 is a front elevational view in partial cross-section of an example of a tire gasification unit according to the invention;

FIG. 2 is a top view in partial cross-section of the tire gasification unit of FIG. 1;

FIG. 3 is a side view in cross-section taken along lines 3—3 of FIG. 2, showing the mixing and combustion chambers;

FIG. 4 is a front view in cross-section taken along lines 4—4 of FIG. 3, showing the mixing chamber; and

FIG. 5 is a side, elevational view of the inner tube end 90 of FIG. 3.

DETAILED DESCRIPTION OF THE INVENTION

Referring first to FIGS. 1 and 2, an example of a tire gasification unit 10 according to the invention is shown which comprises a pair of closed cylindrical housings 12

(FIG. 3). The middle tube 74 is coaxially mounted within the outer tube 76. A forward end 84 of the middle tube 74 is spaced somewhat rearwardly of the forward end 80 of the outer tube 76, and the middle tube is shorter than the outer tube such that a rearward end 86 of the middle tube is forward of the rearward end 82 of the outer tube, causing the middle tube 74 to be wholly contained within the outer tube 76. Most of the forward end 84 of the middle tube is closed while the rearward end 86 is open. The inner tube 72 is coaxially mounted within the middle tube 74, and an open forward end 88 is flush with the forward end 84 of the middle tube. An open rearward end 90 of the inner tube 72 is disposed forwardly of the rearward end 86 of the middle tube 74. The tubes 72, 74, 76 are oriented in this manner in order to provide optimum mixing of the vaporized volatiles from the vaporization chamber with ambient air for efficient combustion. As will be apparent, the middle tube 74 is both of a smaller diameter and shorter in length than the outer tube 76, and the inner tube 72 is of a smaller diameter and shorter in length than the middle tube 74. In the preferred embodiment, the outer tube 76 has a radius of 8 inches and a length of 39 inches. The middle tube 74 has a radius of 6 inches and a length of 36 inches. The inner tube 72 has a radius of 2 inches and a length of 29 inches. The tubes are constructed of steel or other suitable heat resistant material.

The vapor exhaust housing 56, from the housing 12, extends through the outer tube 76, outer chamber 70, and middle tube 74 into the middle chamber 68. Although not shown, the vapor exhaust housing 60, from the housing 14, does the same from the opposite side of the mixing chamber 58.

The forward end 80 of the outer tube 76 contains an opening 92, forwardly of and coaxial with the open forward end 88 of the inner tube 72, which opens to a blower housing 94 containing a blower 96. A control valve 98 opens into the blower housing 94 to supply ambient air thereto for blowing into the mixing chamber 58. The air forced by the blower through the opening 92 is supplied both to the outer chamber 70 and inner chamber 66 because of the open forward end 88 of the inner tube 72. Since the volatiles from the vapor exhaust 56 are supplied into the middle chamber 68, the mixing chamber 58 mixes these volatiles with air both from the inner chamber 66 and from the outer chamber 70, for thorough mixing.

The rearward end 90 of the inner tube 72 is equipped with a nozzle 100 (FIG. 5) which furthers the mixing of the air and volatiles. The nozzle 100 preferably is created by making partial arc cuts on opposing sides of the inner tube 72 near the rearward end 90, and bending the portions 101 and 103 of the inner tube above the cuts inwardly, creating additional side openings 104. These, in conjunction with the open rearward end 90, cause the ambient air exiting the inner chamber 66 to be turbulent, contributing to the thorough mix of the air with the volatiles in the middle chamber 68.

A propane intake pipe 106 enters the middle chamber 68 through the outer and middle tubes 74 and 76 and slightly rearward of the rearward end 90 of the inner tube 72. The propane intake pipe 106 supplies propane gas or other combustible to the middle chamber 68 to assist in the ignition and combusting of the volatile/air mixture resulting from the air from the inner chamber 66 mixing with the volatiles in the middle chamber 68. Generally, propane need only be supplied into the com-

busting mixture until its temperature is high enough to sustain combustion alone.

A conventional igniter 108, electrical or other equivalent, is provided at the open rearward end 86 of the middle tube to ignite the volatile/air/propane mixture to commence its combustion as the mixture is forced out of the end 86 of the middle tube. At approximately the same time as the mixture is ignited, the mixture is further mixed with air from the outer chamber 70 to enhance complete and thorough combustion.

A combustion chamber 110 is disposed rearwardly of the mixing chamber 58 and receives the ignited volatile/air/propane mixture from the open rearward end 82 of the outer tube. The combustion chamber 110 is cylindrical and contains flat baffles 112 which extend between opposite sidewalls of the chamber 110, for thorough mixing of the volatiles with the air for complete combustion. The baffles 112 are tilted at opposing slopes at an angle of about 90 degrees, extending across the width of the combustion chamber 110, and cause a turbulent or tumbling effect in the mixture as it enters the chamber. An outlet pipe 114 extends from the rearward end of the combustion chamber 110 and carries away the heat generated by the combustion of the mixture for use in whatever application is desired. The combustion chamber 110 therefore provides additional mixing of the mixture components and completes the combustion which was started by the igniter 108. A pressure vent 116 is provided in the combustion chamber 110 to release pressure at unsafe levels.

In operation of the apparatus 10 (FIGS. 1 and 2), twenty to twenty-five tires 16, weighing a total of about 500 pounds, are loaded into the tire hopper 26 and vaporization chamber 28, defined by the housing 12, through the top end of the housing. The tires 16 are packed into the housing 12 and are in a whole, unshredded, state. The lid 20 of the housing is then closed and the clamp members 24 are secured to create a substantially airtight seal. Propane gas, supplied through the supply tube 32, is then introduced, along with air, into the vaporization chamber 2 through the ignition valve 30. Air may also be introduced into the vaporization chamber 28 through the air intake assembly 34. The propane and air are directed toward the center and bottom of the vaporization chamber 28 and are then ignited by the ignition valve 30. Controlled oxidation of the tires begins and moves across the bottom of the vaporization chamber 28 as it overtakes more tires.

Ideally, the ignition valve 30 would be operated to deliver propane into the vaporization chamber 28 after ignition since the propane is placed into the chamber simply to initiate oxidation of the tires. As a practical matter, it may be necessary to deliver more propane into the vaporization chamber after ignition in order properly to initiate the process. Preferably, once ignition occurs the bottom layer of tires in the vaporization chamber 28 begins to oxidize and the oxidation continues without need for further combustible fuel at relatively low heat levels. It has been found that two gallons of propane gas are satisfactory for ignition and commencement of oxidation. After ignition, air continues to be introduced at a controlled rate into the vaporization chamber through the ring manifold 44 to continue the oxidation, but it is carefully metered through manual adjustment of the control valve 42. Other adjustment means could be substituted, such as computer-controlled adjustment. Temperature measurements could be made on a continual basis using conventional

temperature measuring devices disposed, for example, in the walls of the housings 12 and 14.

The controlling of the oxidation rate of the tires is important to the process. If too much air is allowed into the vaporization chamber the tires will burst into flame instead of steadily oxidizing. If too little is allowed in the oxidation will slow unnecessarily. It follows that the container 12 must be substantially airtight in order for the air allowed in to be metered precisely.

The approximate startup time for the process in the preferred embodiment of the apparatus is 45 minutes. With 20 to 25 tires in the housing 12 the process will continue for approximately 8 to 12 hours.

The oxidation of the bottom layer of tires results in heat. When the temperature reaches a level of approximately 300 degrees Fahrenheit, or on the order of between 250 and 350 degrees Fahrenheit, the tires above the bottom layer anaerobically begin to vaporize or gasify, releasing volatile vapors, caused by the heat and the deprivation of oxygen from the upper portion of the vaporization chamber 28, which is filled at this point with carbon dioxide and carbon monoxide. The heat level generated by the oxidation is high enough to stimulate vaporization, but low enough to prevent combustion, i.e., open burning, of the tires. The volatile vapors released from the tires are principally complex hydrocarbons such as ethylene and butylene.

Solid particulate matter left behind in the vaporization chamber 28 after all of the tires are oxidized and/or vaporized comprises approximately five percent of the petrochemical content of the tires as well as steel wire used in tire construction. Although residual carbon ash bound material can also be incinerated, if desired, it is not energy efficient. If continuous operation is desired, after the tires in the housing 12 have been consumed the gasification process is continued in the housing 14 while the housing 12 cools, the residue in the vaporization chamber 12 is removed and the chamber cleaned, and the housing 12 again filled with tires.

The volatile gases or vapors leave the vaporization chamber 28 through the open end of the vapor exhaust manifold 54 and are released into the middle chamber 68 of the mixing chamber 58 (FIG. 3) where they are mixed with air for thorough combustion. The air from the blower 96 and control valve 98 is forced into the forward end 88 of the inner tube 72 and through the inner chamber 66 to the rearward end 90 of the inner tube, where it mixes with the volatile gases in the middle chamber 68, the mixing being enhanced by the turbulence caused by the nozzle 100. The air/vapor mixture from the inner and middle chambers 66 and 68 then moves farther toward the rearward end 86 of the middle tube and is mixed with propane introduced into the middle chamber by the propane intake pipe 106. The air/vapor/propane mixture then reaches the rearward end 86 of the middle tube and is ignited by the igniter 108, combusting into the combustion chamber 110 and mixing with the air from the outer chamber 70. The combusting mixture is then tumbled in the combustion chamber 110 by the baffles 112 for efficient burning. Little to no carbon residue remains after the burning of the volatile gas mixture. The heated air from the combustion is then output from the combustion chamber 110 through the outlet pipe 114. The air output from the combustion chamber 110 is approximately 1600 degrees Fahrenheit, or on the order of between 1100 and 2200 degrees Fahrenheit. Approximately 500 pounds of tires

will produce over four million BTU's using the process described.

The stack emissions of the process are within the air quality limits set by the U.S. Department of Air Quality (DEQ) with about 4% carbon dioxide, 14% oxygen, and non-detectable carbon monoxide. TPE, SO₂, NO_x, and VOC are also well within DEQ and Environmental Protection Agency clean air standards.

The propane supplied through the propane intake pipe 106 is supplied only to start the ignition of the volatile vapor/air mixture. Once the temperature is hot enough, e.g., 500 degrees Fahrenheit in a preferred embodiment, the propane is shut off since the mixture is able now to ignite on its own.

The inventive apparatus and process described herein results in no detectable carbon monoxide or other harmful burn byproduct. Little particulate matter results from the process, consisting mainly of non-carbon based matter from the tires such as steel belts or mesh and some slight carbon residue from the burning of the volatile gases. There is much greater burn efficiency, since much more heat is output from the gasification process than with open air burning of tires. The process is clean, highly efficient, and disposes of whole tires without the need for antecedent shredding. In the preferred embodiment described, the apparatus is portable for maximum efficiency and convenience.

These tires will vaporize in an 8 to 12 hour cycle in a preferred embodiment, producing over four million BTU's. Vaporization time depends on CFM delivered and the heat tolerance of the materials of which the apparatus 10 is constructed.

It can be seen that used vehicle tires, normally considered wasteful and hard to dispose of properly, are disposed of by the present invention with a minimum of residue and with a great amount of energy which may be used for powering other apparatuses. It has been found that the carbon residue left by the tires can also be incinerated, but that the energy necessary for this operation is not worth it. It can be carried out, however, if desired.

I claim:

1. A process of vaporizing tires comprising the steps of:
 - placing whole tires in a substantially airtight housing; supplying a pre-determined amount of combustible fluid into the housing to initiate oxidation of the tires;
 - supplying a pre-determined amount of oxygen into the housing to maintain a temperature inside said housing at approximately five hundred (500) degrees Fahrenheit, and greater, during oxidation of said tires;
 - igniting the combustible fluid, causing initial combustion of the combustible fluid and subsequent oxidation of the tires; and
 - supplying additional oxygen into the housing at a controlled rate sufficient to continue oxidation of the tires and to prevent further combustion, thereby anaerobically vaporizing the tires and causing volatile gases to be released from the tires.
2. The process of claim 1 further comprising the step of supplying additional combustible fluid into the housing after ignition, to maintain oxidation of the tires.
3. The process of claim 1 further comprising the step of withdrawing volatile gases from the housing at a predetermined level in the housing.

4. The process of claim 3 wherein said combustible fluid and oxygen supplying steps comprise supplying combustible fluid and oxygen to the housing at a location below the level at which volatile gases are withdrawn.

5. The process of claim 3 further comprising the step of combusting the volatile gases withdrawn from the housing to generate heat.

6. A method of mixing volatile gases with air in a mixing chamber comprising an elongate outer compartment, an elongate middle compartment disposed substantially wholly within the outer compartment and having an open end feeding into the outer compartment, and an elongate inner compartment disposed substantially wholly within the middle compartment and having an open end feeding into the middle compartment, comprising the steps of:

- (a) supplying air into the inner and outer compartments;
- (b) supplying volatile gases into the middle compartment;
- (c) forcing the air in the inner compartment through the open end thereof into the middle compartment, thereby mixing the air from the inner compartment with the volatile gases in the middle compartment; and
- (d) forcing the mixture of volatile gases and air in the middle compartment through the open end thereof into the outer compartment, thereby further mixing the mixture of volatile gases and air in the middle compartment with the air in the outer compartment.

7. The method of claim 6 further comprising the steps of supplying a combustible fluid into the middle compartment and mixing it with the mixture of volatile gases and air and igniting the combustible fluid to cause combustion of the volatile fluid.

8. The method of claim 6 further comprising the steps of forcing the mixture of volatile gases and air in the outer compartment to enter a combustion chamber adjacent the mixing chamber and further mixing the mixture by forcing it past one or more baffles in the combustion chamber.

9. The method of claim 6 wherein step (c) comprises forcing air in the inner compartment through the open end thereof, and through openings in the sides of the inner compartment, near the open end.

10. Method of gasifying tires comprising the steps of: placing tires in a substantially airtight housing; introducing a pre-determined amount of combustible fluid into the housing to initiate oxidation of the tire; introducing a pre-determined amount of oxygen into the housing; igniting the combustible fluid, causing initial combustion of the combustible fluid and subsequent oxidation of the tire; introducing additional oxygen into the housing at a controlled rate rapidly enough to continue oxidation of the tire and slowly enough to prevent further combustion to maintain a temperature inside said housing at approximately five hundred (500) degrees Fahrenheit, and greater, during oxidation of said tires, thereby anaerobically vaporizing the tire and causing volatile gases to be released from the tire; moving the volatile gases from the housing into a mixing chamber;

11. The method of claim 9 further comprising the step of mixing the air/volatile gas mixture with a combus-

ble fluid and subsequently igniting the combustible fluid to combust the air/volatile gas mixture to produce heat.

12. Apparatus for vaporizing tires to produce volatile gases and solid residue, comprising:

- a substantially air-tight cylindrical vaporization chamber for receiving and holding tires to be vaporized;
- an air intake leading into said cylindrical vaporization chamber for supplying air thereto, said air intake including valve means for selectively controlling the quantity of air supplied into said cylindrical vaporization chamber;
- a combustible fluid intake leading into said cylindrical vaporization chamber for supplying combustible fluid to begin oxidation and vaporization of the tires; and
- a volatile gases withdrawal manifold that is a ring manifold extending around at least a part of the interior periphery of said cylindrical vaporization chamber that is open at its ends disposed in and leading out of the vaporization chamber for withdrawing volatile gases produced by oxidation of the tires.

13. The apparatus of claim 12 further comprising a hatch disposed in the vaporization chamber to allow access to the chamber for removal of solid residue.

14. The apparatus of claim 12 wherein the volatile gases withdrawal manifold is disposed at an elevation in the vaporization chamber higher than the elevations of the air and combustible fluid intakes.

15. The apparatus of claim 12 wherein the vaporization chamber is substantially cylindrical and the air intake comprises a ring manifold extending around at least part of the interior periphery of the vaporization chamber, to direct air toward the center of the chamber.

16. Apparatus for vaporizing and gasifying tires comprising:

- a vaporization chamber for vaporizing tires resulting in volatile gases;
- a mixing chamber disposed in communication with the vaporization chamber for reception and mixing of the volatile gases, said mixing chamber comprising:
 - an outer compartment;
 - a middle compartment disposed substantially within the outer compartment for reception of the volatile gases from the vaporization chamber and mixing the volatile gases with air;
 - an inner compartment disposed substantially within the middle compartment to force air into contact with the volatile gases contained in the middle compartment;
- wherein the volatile gases and air mixed in the middle compartment are further mixed with air in the outer compartment.

17. The apparatus of claim 16 further comprising a combustion chamber disposed in series with the mixing chamber for reception and combustion of the air/volatile gases mixture.

18. The apparatus of claim 17 further comprising a plurality of baffles disposed in the combustion chamber to create turbulence in the mixture for more thorough mixing thereof.

19. The apparatus of claim 17 wherein the wherein the baffles are generally planar and are tilted relative to each other.

20. The apparatus of claim 16 wherein the inner compartment is elongate with an open end opening into the middle compartment, said open end further comprising a plurality of openings staggered and displaced from each other for linear and lateral dispensing of air passing through the inner compartment.

SOUTHERN UTAH TIRE RECYCLERS

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AGRICULTURAL DYNAMICS

BUSINESS PLAN

Southern Utah Tire Recyclers & Agricultural Dynamics

1. 0 Executive Summary

By focusing on it's strengths, it's key customers, and superior products, Southern Utah Tire Recycles and Agricultural Dynamics, by providing energy to its commercial greenhouse operation, will achieve success in the first year of operation, and then improve each year thereafter.

This business plan leads the way. It facilitates our vision and strategic focus on providing superior quality products to our target market segments, the retail and commercial produce consumers, and the individual and commercial greenhouse operations.

This plan includes this summary, and chapters on the company, products and services, market focus, action plans and forecast, management team, and financial plan.

1. 1 Objectives

1. Sales of \$1 million in 1997 and \$1.2 million by 1998.
2. Gross margin higher than 60%
3. Net income more than 15% of sales by the third year.

1. 2 Mission

Southern Utah Tire Recycles and Agricultural Dynamics is a company dedicated to developing a viable solution to the elimination of the problem of used tires locally by using technology to convert this stored energy into other useful energy sources. Southern Utah Tire Recycles and Agricultural Dynamics is also dedicated to the application of biodynamics in the production of produce in greenhouses and other products that improve the lives of our fellow men.

The success to the operation will come from co-generation of electrical energy as well as heat to the commercial greenhouse operation and providing the high value products from the operation to the market place.

1. 3 Keys to Success

1. Excellence in fulfilling promises by being completely reliable and informed of advancements in new technology.
2. Consistently developing new business leads in the market place.
3. Development of expertise into multiple revenue generating opportunities consistent with our Mission Statement.

Southern Utah Tire Recyclers & Agricultural Dynamics

2. 0 Company Summary

Southern Utah Tire Recycles and Agricultural Dynamics is a new company formed to convert used tires, a hazardous waste problem, into clean energy for the operation of commercial greenhouses.

This operation will grow ultra high nutritionally complete food products. It will focus initially on the recovery of heat from waste tires to heat greenhouses and the production and harvesting of high quality organic produce and herbs, then expand to recovery of products from waste tires that can be recycled. The company was organized in Utah in 1996.

2. 1 Company Ownership

Southern Utah Tire Recyclers and Agricultural Dynamics are new companies recently formed.

Members of the advisory board include professional individuals in the areas of greenhouse manufacturing and operations, produce warehouse operations, marketing, customer relations, and office clerical including accounting and legal counsel.

2. 2 Startup Summary

Our start-up costs will be approx. \$100,000 which includes legal costs, permits, some additional equipment and expenses associated with opening the administrative office. The start-up costs are to be financed by direct owner investment.

2. 3 Company Products

The product line of Southern Utah Tire Recyclers and Agricultural Dynamics will be determined by the needs of the market to a great degree:

- The product line supplied by Agricultural Dynamics are Biodynamically complete, organically grown, produce.
- Biodynamic because produce is grown in soil that has had over 50 minerals re-introduced.
- Organic because the crops are grown without using commercial insecticides or fertilizers.

2. 4 Company Locations and Facilities

Headquarters are located in a 10,200 square foot building at 1410 South 2400 West, Beryl, Utah.

This is the location of the Old Hecla Mining Facility Vehicle repair and administration offices. It is located in Section 2, Township 36 South Range 17 West.

This includes administrative offices, shop facilities, dock and warehouse space for large walk-in coolers and storage areas necessary to wholesale produce from the greenhouse operation.

Southern Utah Tire Recyclers & Agricultural Dynamics

3.0 Products

The products produced by Southern Utah Tire Recyclers and Agricultural Dynamics will be the energy needs of a commercial greenhouse operation and biodynamically balanced organic produce and herbs.

Further expansion of the operations will produce the following items from Waste tires:

Carbon Black to be sold to carbon brokers,

Fuel oil to be sold to refineries, and

High tensile steel to be sold to metal recyclers.

In addition to these products, there will be additional heat generated to allow expansion of the Greenhouse operations.

3.1 Product Description

Through its commercial greenhouse operation, Agricultural Dynamics will begin producing biodynamically balanced tomatoes, cucumbers, melons, specialty herbs, etc.

Through its recycling facility, Southern Utah Tire Recyclers will produce heat to Agricultural Dynamics for the Greenhouse operations. Future expansion of the recycling facility will require moving the recycling facility a block south to the old Hecka mine site and installing state-of-the-art whole tire pyrolysis equipment to produce Carbon Black, fuel oil, and high tensile steel.

3.2 Competitive Comparison

Produce grown by the commercial greenhouse operation includes several important advantages that set them apart from other products that may be considered competitive:

- The concept of feeding the soil instead of just the plant, produces plants that are less susceptible to blemish or disease, thereby making a much more visually appealing product.
- With the abundant energy derived from recycling, consistent temperatures can be assured in the greenhouse operations, helping to eliminate loss by low temperatures and improving the profit picture.

4. 0 Market Analysis Summary

The market for high quality produce, fruits and herbs is without estimate, and with the drought, flood and other natural disasters that have happened throughout the country in the last several years, the market is likely to grow exponentially.

In the local area alone comprising of Southern Utah, Eastern Nevada, and Northern Arizona, there have been estimates of many millions dollars worth of produce sold each year.

4. 1 Market Segmentation

The produce market is divided into basically 3 segments, wholesale, retail, and speciality markets.

The wholesale market includes sales to local grocery stores and the California wholesale market.

The retail market includes sales to the public.

The speciality market includes sales to health food stores, restaurants, natural health clinics, and vegetarian societies. These markets have already been generated.

4. 2 Industry Analysis

The produce industry is one of the world's oldest. Food production has been listed as the number 1 concern to mankind.

Production of biodynamically balanced produce is of such demand currently and the supply so limited, that there does not appear that there will ever be a shortage of demand.

4. 2. 1 Industry Participants

The produce industry is a mature industry characterized by steady growth rates, which parallels the migration of people to the Western United States.

Do to the growing season of outside vegetable gardens and commercial operations, there is a necessity of transporting produce to this area during the winter months. There are few leaders in these markets. Most of the produce available to us comes from operations in California.

4. 2. 2 Distribution Patterns

Distribution channels are not a serious bottleneck. Southern Utah Tire Recyclers and Agricultural Dynamics has the ability to establish the transportation routes necessary for proper distribution.

Generally, the same routes will be followed that will be established in collecting the necessary tires for the energy needs of the commercial greenhouse operation.

4. 2. 3 Competition and Buying Patterns

Because of the growing season and the scarcity of competition, prices should be able to be maintained at a consistently high level.

Buying Patterns are relatively constant, everyone needs to eat.

4. 2. 4 Main Competitors

Southern Utah has a great need for a recycling facility to eliminate the hazardous waste created by used tires, there are no competitors currently in Southern Utah. The environmentally safe method used by this patented method to create energy provides an edge over any competition.

Competition in the market for biodynamically grown organic produce is very small in the United States. Recent technology advances in this field has left most growers unable or unwilling to update, thus providing us with a further edge.

4. 3 Market Analysis

The market analysis is shown on the following pages. The largest group of customers is the wholesale group, which is projected to grow at 4% per year. The fastest growing segment is the speciality market, which is projected to grow at 50% per year.

The market analysis is shown in the following table, and the market pie chart illustrates our key customer segments.

5. 2. 2 Sales Programs

5. 3 Strategic Alliances

5. 4 Service and Support

5. 5 Milestones

6.0 Management Summary

Immediate personnel plans call for increases from 10 people at present to 40 two years from now. The increase is needed to support the effort to broaden our customer and product base.

We will continue to work with part-time people to handle tire burner operation as well as construction of greenhouses, installation of boilers and co-generation systems, and eventually pickers and packers.

6.1 Organizational Structure

6.2 Management Team

6.3 Management Team Gaps

6.4 Personnel Plan

6.5 Other Management Considerations

7.0 Financial Plan

- We want to finance growth mainly through cash flow. We recognize that this means we will have to grow more slowly than we might like.
- The most important factor in growth in our case will be a quality end product. If our harvest is consistent the company will grow at a consistent rate.
- The collection cycle is very important. We do not want to let our average collection days get above 45 under any circumstances.

7.1 Important Assumptions

7.2 Key Financial Indicators

7.3 Break-even Analysis

7.4 Projected Profit and Loss

7.5 Projected Cash Flow

7.6 Projected Balance Sheet

7.7 Business Ratios